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FLIGHT

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The AIRCRAFT ENGINEER AND AIRSHIPS

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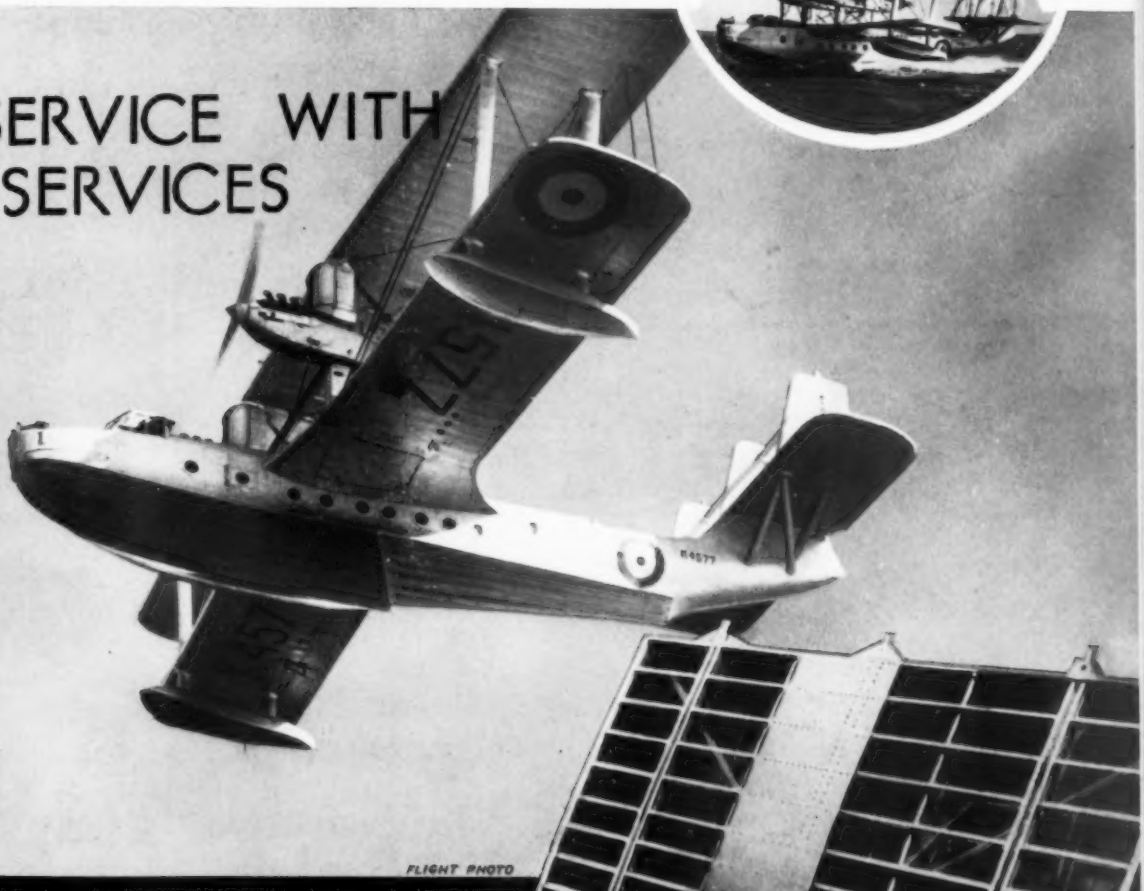

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Weaving the Strands

THIS issue of *Flight* appears between Empire Day and Empire Air Day. In the year 1937 these two days are of very particular significance. His Majesty King George VI was crowned but recently; leading statesmen from overseas with delegates from many parts of the Empire are in England to take part in the Imperial Conference; and the international political situation is one which calls for statesmanship of a high order if it is to be prevented from becoming worse.

No better guarantee of continued peace could be imagined than a strong, united, single-minded British Commonwealth of Nations, and at no time have the conditions for achieving this end been more propitious. Thus the Imperial Conference is taking place at a time when a free and frank discussion, not only of Empire problems but of world affairs, may have the most profound effect at home and abroad.

The festival of Empire Day commemorates the birthday of Queen Victoria and falls this year within a few weeks of the centenary of the beginning of her reign, a reign during which the prestige of the British Empire increased tremendously. To-day the carrying-out of the Empire's work is very closely linked with the progress of flying, both from the commercial and the military points of view. On Saturday, Empire Air Day, visitors to R.A.F. aerodromes all over the country will have an opportunity of seeing for themselves some of the work done in training that great service for its task of helping to keep the peace of the world and ensuring the security of the British Empire. In a month's time, too, tens of thousands will see the culmination of that training at the R.A.F. Display at Hendon.

Far less spectacular, but in many ways equally important, is the good work being done in linking together the distant parts of the Empire by commercial air routes. Here also 1937 is a noteworthy year, for it will see the inauguration of the carriage of all first-class mail by air to the Cape and towards Australia. It will see also experimental flights across the Atlantic to obtain data for regular services to Canada and the United States. The greater problems having been solved, the smaller will follow automatically, and, in addition to the extension of the England-Australia flying-boat route to New Zealand, British islands in the Pacific will doubtless be joined to the chain, which will thus completely circle the globe. Though that is not likely to come about this year the first great and important steps are being taken now, and there is no reason to doubt that in time the rest will follow as a matter of course.

Bridging the Gap

Already the benefits of rapid communications between distant parts of the British Empire have been experienced, and there is every reason to think that they will increase by leaps and bounds as the technique of flying improves. The first faltering steps were made many years ago, but progress was of necessity somewhat slow, and some who expected of flying more than it was able to give were bound to be disappointed. In addition to aerotechnical problems there were geographical, financial and political difficulties to be overcome, and until these had been settled full use could not be made of the technical progress in aircraft design and construction. Now, however, all these seem in a fair way to being solved, one way or another, and it so happens that the last two or three years have seen a quite remarkable improvement in commercial aircraft.

Not only are the aeroplanes now available or coming along in the near future of very much better performance than those hitherto used, but, aided by proper ground organisation, they promise to combine a high order of passenger comfort with that all-weather service regularity which plays such an important part in attracting traffic. At first the schedules will be placed on a very conservative basis in order that any time lost on one section of a route may be made up on another and the arrival at the termini kept strictly to schedule. As more experience is gained, it is legitimate to hope that a speeding-up may prove possible and the most distant parts of the Empire be brought within one week of London.

Geographical obstacles may now be said to exist to any serious extent on the Atlantic routes only. Between London and Australia-New Zealand and London and Capetown no stages call for exceptional range without alighting. Across the Atlantic it is different. The shortest route, between Ireland and Newfoundland, necessitates a fuel supply which must make serious inroads on pay-load, and is, moreover, a route on which at certain times of the year the weather conditions are far from being favourable. The same may be said to apply to the far-north route via Iceland and Greenland, and the alternative to the shortest route is likely to be via Portugal, the Azores and Bermuda. Until experience has been gained from actual trial flights over a considerable period, it is impossible to foresee how the Atlantic service will shape, but whichever route is chosen, the schedule is likely, when regular services begin, to vary somewhat with the time of year, and also to be based on higher speeds on west-to-east flights than on east-to-west, owing to the prevalence of south-westerly winds.

In the Pacific the conditions are somewhat different, although the problems are as great in their own way. There it becomes a question not so much of linking London direct with British islands in the Pacific as of coupling them with Canada on the one hand and with New Zealand and Australia on the other. Ranges of 2,000 miles will be the order of the day, and in addition an agreement with the United States to let a British service use American bases on the Pacific coast and in Hawaii will be required. All this is likely to take time, and America has already made a start by sending a flying boat on a survey flight from Hawaii to New Zealand. Unless and until very long range can be combined with a reasonable pay-load, it seems likely that Canada will have to depend on American co-operation for her air communication with the Pacific islands, Australia and New Zealand, or else use the longer all-British route via England, Egypt and India.

A logical corollary when the main trunk routes have been firmly established is a series of feeder services to link up with the trunk routes and bring the benefits of rapid communications to other parts of the Empire, situated some distance, and sometimes great distances, from the trunk routes. That these will spring up in Africa and India is, of course, certain. The transfer of the flying-boat route to the east coast of Australia will produce a need for alterations in the Australian network, and may later result in extensions to islands in the Pacific. But, keeping to the simile of the spider's web, the first supporting strands are now being put into place, and the tangential ones will follow in due course.

GRACE, MIGHT AND VICTORIAN DIGNITY: A fine Royal Review impression of Fairey Swordfish of the Fleet Air Arm passing the austere bulk of H.M.S. *Nelson* and the contrasting lines of the Royal Yacht, *Victoria and Albert*. As reported on page 528, large formations Fleet aircraft took part in the fly-past.

The Outlook

A Running Commentary on Air Topics

Star Turn

THAT high average speeds can be maintained in spite of stops for refuelling was demonstrated last Sunday by Imperial Airways' Short boat *Cassiopeia*, when she left Alexandria at 2.40 a.m. and arrived at Southampton at 8.20 p.m., having covered approximately 2,300 miles in just under 18 hours. Imperial Airways may well be proud of this record, which shows that in our latest marine aircraft we are not behind any nation in the world.

Pan American Airways, on the California-Hawaii section of their transpacific air route, have to cover a similar stage non-stop, and do so regularly. Superficial critics might use this fact as a proof of American superiority. It is, however, necessary to bear in mind that no operating company will deliberately choose stages of more than 2,000 miles if they can be avoided. Between San Francisco and Honolulu there are no refuelling bases and the flight must perforce be made non-stop. The result is, of course, that the pay-load is very greatly reduced.

The *Cassiopeia* carried, in addition to fuel for the longest stages, those from Alexandria to Athens and from Marseilles to Southampton, 14 passengers and approximately 1½ ton of mails. That represented a very respectable pay-load, and, in spite of stops for refuelling at Athens, Brindisi, Rome and Marseilles, the average route speed worked out at 128 m.p.h.

What is significant is that the flight shows that, provided the start of a long flight on the Empire air routes can be made before dawn, really impressive distances can be covered before dusk, even when economically short stages make possible a remunerative pay-load.

Dr. Eckener's Theory

DIFFICULTIES in obtaining actual proof of what caused the recent disaster to the German airship *Hindenburg* may compel the American board of enquiry to fall back on theories concerning what is likely to have happened. At last Sunday's hearing Dr. Hugo Eckener, the veteran airship commander and head of the Zeppelin company, advanced one such theory which appears to be the most plausible heard so far.

The *Hindenburg* was seen to be down by the stern when approaching the mast, and also began a sharp turn towards the mast. He thought that the hard use of the rudders might conceivably have imposed upon the structure stresses sufficiently severe to snap one of the shear wires in the aft part of the airship. If that was indeed what had happened, subsequent events could be explained simply enough by assuming that the broken wire tore a gas bag; the hydrogen leaking out would then have mixed with the air in the space between gas bags and outer cover and a highly explosive mixture would have been formed.

As to how the static spark was caused, Dr. Eckener suggested that when the mooring lines were dropped they were quite dry and therefore poor electrical conductors. There was, however, a drizzling rain falling at the time, and after a few moments the ropes would be getting wet. While in their semi-wet state they would offer considerable electrical resistance, and this fact might have caused a spark to flash across inside the airship instead of the electricity passing harmlessly down the mooring lines.

The reports which have reached this country are not very complete, but it would appear that the real test of the plausibility of Dr. Eckener's hypothesis depends upon whether the airship was seen to turn sharply towards the mast *before* she was observed to be down by the stern. If the sequence was reversed, i.e., if tail-heaviness was seen before the sharp turn, the theory of the broken shear wire causing the leak falls down, unless the wire was broken earlier and not during the sharp turn near the mast.

A Red Pole?

JURISTS may possibly find much to amuse them in the quaint situation which has arisen with the establishment by the Northern Sea Route Department of the Soviet Government of a base within a very few miles of the North Pole and the reported hoisting there of a Red flag. They may argue that Peary hoisted the American flag there on April 6, 1908, his observations showing 89 deg. 57 min. N. On the other hand, Peary reported that no land was to be seen, and soundings through the ice gave a depth of 1,500 fathoms with no bottom, so that the Arctic regions should, presumably, be regarded as sea and not, therefore, subject to annexation, unless frozen sea should be treated as land, which seems illogical in view of the known drift of the ice fields.

Flying folk will be less interested in that aspect of the Russian enterprise than in the significance of the fact that a permanent base has been established from which already Professor Schmidt and his companions have sent radio weather reports for retransmission.

Should the Russian expedition find it possible to maintain a base at the North Pole for one year, as planned at present, with adequate modern equipment for topographical and geodetic measurements as well as accumulation and dissemination of meteorological data, Soviet Russia may well prove to have rendered signal service to the world in general. The perseverance with which she has continued the arduous work of preparation for the establishment of an Arctic base is worthy of unstinted admiration, and the Russians may well feel that they have now revenged themselves on Nature for the defeat they suffered over the *Chelyuskin* expedition a year or two ago.

Cruising at 200 m.p.h.

FOR the first time in history a British commercial aeroplane has been produced which, there is reason to believe, will cruise at rather better than 200 m.p.h. The new De Havilland Albatross was flown for the first time last week (see page 529), and although obviously in a first test flight no attempt was made to obtain performance figures, the general behaviour of the machine was so fully what had been expected of it that there is little doubt that in the matter of sheer performance the estimates will also be found to have been fulfilled.

Details of the construction of the Albatross cannot be disclosed yet, but when this becomes possible it will be found that the structural design is quite as interesting and bold as the aerodynamic.

In the meantime the prestige of British aviation will be considerably enhanced by the knowledge that, whether used for ordinary land routes of toleraby short stages or for experimental flights over the Atlantic, the new machine is the equal of anything built in any country. A cruising speed of 200 m.p.h., coupled with fairly long stages, should make possible a journey speed of some 160-170 m.p.h. on a route like the England-South Africa one, for mails at any rate. Passengers will need longer rests at refuelling points, and this fact might lower the route speed somewhat.

DIARY OF FORTHCOMING EVENTS—PAGE 540.

DROPPING DOWN TO RIO

Some Incidents and Impressions of an Unusual Mission—Demonstrating a British Parachute in South America

By BEN H. TURNER

SOME months ago I sat watching lifebelt drill on an ocean liner making its way across the Atlantic at a good 380 miles a day towards South America. Nearer and nearer we drew to Pernambuco. If anything were to go wrong, I thought, all these hundreds of lives would possibly be forfeit; but for lifebelts and lifeboats how utterly helpless we should be so many miles from land! It seemed such a pity, I mused, that we were not forced by law to have an equivalent safeguard in the air. How helpless are the passengers if serious trouble develops in an air liner!

It is sometimes argued that passengers may become nervous at the idea of being provided with a parachute. But do people get panicky on entering buildings because fire buckets are provided in case of fire? And how many sea passengers have suffered from loss of sleep because lifebelts are provided in their cabins? No! They study the fore-and-aft view of the fellow in the Board of Trade picture, "How to wear the life-saving apparatus," and more often than not, are mildly amused by it. It is a mistaken idea that people will shun flying if parachutes pop at them when stepping into an air liner; on the contrary, if they were educated up to the facts many more would fly in consequence of the additional safety factor manifest. In any case, parachutes have been designed which in the cabin of an air liner look like nothing more than comfortably padded seats.

The years I myself have spent in parachuting have been occupied in what the majority of people would call clowning. In other words, in climbing to a sufficient altitude and then, for no apparent reason, scorning any further use for a perfectly good aeroplane and preferring to fall headlong to earth in a most undignified manner for a couple of hundred feet or so, finally pulling that piece of cord which is termed R.I.P.—a 16lb. pull which makes all the difference between "Rest in Peace" and "Rest in One Piece."

Has such "clowning" served no other purpose than to give a certain thrill to many who come to see air circuses from the wrong side of the screening? They look at the fellow as he goes up with sympathy in their eyes and a sort of morbid expectation in their minds that it may not open—"I hope it doesn't; but I do hope the poor chap won't get hurt."

Personally, I must admit I have never parachuted to amuse the public; I have looked upon it as a demonstration of the safety of the modern parachute correctly handled.

Rio de Janeiro: The aerial view of the city, seen as the author descended during one of his drops, was "the most magnificent I have ever seen; I could have sung with delight." He is seen in action in the heading picture, taken during his South American tour.

Mr. Ben Turner departs from a Curtiss Robin at Buenos Aires.

Accidents will always occur in every sphere of transport. On our ocean liner we as passengers were safeguarded; we had lifebelts and lifeboats provided for us by law. It seemed only logical that a time would come when there would be an Air Ministry regulation that would enforce the provision of a lifebuoy of the air for every human being that flew above this earth. But it was not for me to lay down the law, and at this stage nothing could have been done about it, anyway, for actually I was on my way to South America to demonstrate a British parachute, the G.Q., to that market.

We arrived in Rio early in June—the commencement of winter in Brazil; winter in a magnificent setting beneath brilliant sunshine. If England had a few days of weather such as this *during her summer* it would probably constitute a record; newspaper headlines would be six inches deep.

I was met there by Mr. Hime, of Walter and Co., the G.Q. agents, and by the South American representative, Capt. Deane, both of whom proved exceptionally kind and helpful. Incidentally, Mr. Hime was responsible for Miss Jean Batten's guidance during her stay in Brazil after her flight across the Atlantic. Within twenty-four hours I had been introduced to the Brazilian Naval Air Service chief, Capt. Bandera, and arrangements made for demonstrations to be carried out on their Island aerodrome.

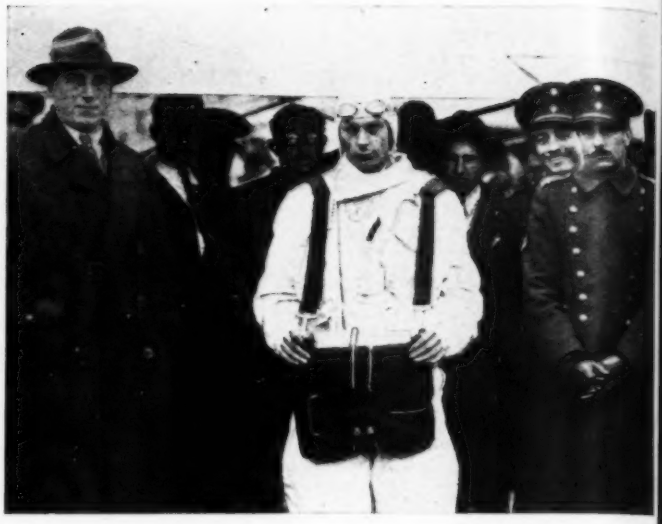
When the appointed time came we had an hour's trip out to this aerodrome and were shown round the training school and hangars. Most of the training aircraft are Tiger Moths, which the pilots handle extremely well. This island, unlike the surrounding country, is as flat as your hand, but not particularly large in area. I was amazed at the efficient way in which numbers of these trainers would fly in tight formation and make excellent landings when it was necessary for them to touch down not many yards from the water-front boundary.

A Model Parachute Room

The parachute room was a model for any aerodrome in England. The parachutes were well serviced and packed away in apple-pie order. The whole place was spotlessly clean and so designed that direct sunlight, which is so detrimental to the silk of a parachute, could not pour on to the canopies as they hung away from the walls for drying. The packing tables, with their beautifully smooth tops, had their legs standing in cans of oil to trap insects, and away from all contact with any of the equipment was a tiled bath for washing with clean water any 'chutes which might have become soiled during use.

Lieut. Serpa, who had previously taken me up for a flight round the aerodrome and Rio, was to be my pilot and friend for the demonstrations. With the aid of a sort of deaf and dumb language which we invented we were soon chatting upon topics in general. In order to land near a desired spot for a demonstration drop it is essential to work in conjunction with a really good pilot. This officer was one hundred per cent. With our thumbs-up and thumbs-down business and a bit of mind-reading he kept a good course, and I was able to leave the

Not a case of cause and effect, but just a successful landing to get a close-up view of somebody else's unsuccessful one. The incident happened at Campo dos Afonsos, near Rio.



The author with Mr. Colin Abbott (left), who flew him during his stay in the Argentine and Uruguay, and "some of the lads."

aeroplane from about 1,500ft. over the identical spot previously chosen.

A delay of a few seconds, and I opened and sailed gently earthwards with the beautiful new canopy glistening white in the sun against a gloriously blue sky. The picture below me was the most magnificent I have ever seen; I could have sung with delight. A few miles away was the city of Rio, nestling amongst the mountains with the blue sea fringing its shores. On its left was that 1,200ft. hump of rock known as the Pão de Assucar, or Sugar Loaf. Rising out of the centre of this fairylike scene was the mighty Corcovado peak, surmounted by the 130ft. high statue of Christ, looking like pure gold in the sun as, with outstretched arms, it dominated Rio 2,300ft. below. I looked behind me; there were the Organ Mountains with "Laughing Old Man," a formation of jagged peaks looking up to the sky, and on their left the five "Fingers of God" pointing towards the sun. In such a setting I wished it were possible to have stayed for ever; but I was soon down to earth again, and the friendly lot of fellows piloted me back to the hangar and my iced *cerveja* (a word soon learned; it means beer).

The officials were particularly interested in the G.Q. parachute. I had taken a number with me, but the one demonstrated was the "Parasuit," which is designed chiefly for use by air gunners and observers, who do not like being hampered in their movements by the orthodox pack. The parachute itself is packed into the back of an ordinary flying suit, no harness being visible, and, therefore, the outfit looks almost like any ordinary flying clothing. The Brazilians, I think, liked the neat and compact construction, the supple silk harness and (since they fly a good deal over water) the life-jacket (made integrally with the collar), which can be inflated instantly by breaking a charge of CO_2.

Brazilian Equipment

In the following week demonstrations were given to the Army Air Corps at Campo dos Afonsos, some miles inland. The officer in charge on this occasion bore the appropriate name of Major Brasil. The machines in the Army Air Corps are mostly American—Waco and Curtiss, although there are a number of Tiger Moths for training purposes; also, Colonel Muniz has designed and manufactured an exceedingly efficient training type, the Muniz I.

During one of my descents at Afonsos a Curtiss which was coming in to land below me decided to sit on its nose. With some judicious steering I managed to land alongside the crack-up, but found the pilot quite happy and with no bones broken. Funnily enough, on a later occasion, when flying round Rio to inspect the new Rio de Janeiro airport (which is being built just outside the city, on a peninsula known as the Panto do Calabouco) we spotted a Waco on its nose in an emergency landing field, and went down to see the trouble. The pilot had suffered no damage and, with the aid of some lads and a rope round the tail, was proceeding to pull the machine back "on its three feet." One enthusiast was clutching the tail and all the rest were hard at work under its nose. It seemed a pity to see such a machine broken in half, so, with a couple of local farm hands, we got ready to take the tail. Thus, the aeroplane was put in a more dignified position and, having seen a new airscrew fitted, off we flew again to the camp. Like all army pilots, these chaps seemed to have charmed lives. They are a fearless set of flyers and are certainly a fine crowd of fellows to know; for this reason alone I was very sorry to leave Rio.

In July I arrived in Buenos Aires. Here, things were not quite so quick; it took three weeks to get the parachutes out of the Customs, and weather was very bad, cold and rain being the order of each day. We were favoured with fine weather eventually, and carried out the first descents at El Palomar, the military aerodrome outside Buenos Aires, before Major Jao Bergamini (commander of the air base) and the chiefs of the military school of aviation.

In the Argentine, the Shell-Mex Argentina organisation was of great assistance to me, and their Mr. Colin Abbott flew me here (and later to Uruguay) for all the remaining descents. He and the managers of San Fernando aerodrome, a civil flying field outside the city, who lent me their Curtiss Robin, were valuable friends during my stay. The Curtiss was an exceptionally easy aeroplane from which to jump. We took the door off the cabin and fixed a jumping-off bar from the undercarriage to the wing strut.

Palomar aerodrome is very large—quite the largest aerodrome I have seen—although Argentina is so flat that it looks like an aerodrome itself. Demonstrations went off satisfactorily here, and once again Colin Abbott and Shell-Mex did everything they could to assist me on my trip from there to Uruguay. Their machine, a Fox Moth, *Gavilan del Plata*, was put at my disposal, and with a few shirts and a toothbrush (not forgetting the good old brollies) we took off from San Fernando for Uruguay. The heavy rains had badly water-logged the aerodrome, but in spite of the load Abbott literally "unstuck" the Fox Moth from the mud in no time.

Great Rivers

We passed over Buenos Aires, the sixth largest city in the world, at about 10,000 feet. With its skyscrapers, it looks like a growing New York. We made our way across the River Plate, its water dark brown in colour, for it is fed by the rivers Parana and Uruguay, which wash mud from their banks hundreds of miles down to the sea. The Atlantic is actually discoloured by this mud many miles from the estuary. One could see dredgers in action below, clearing the long, buoy-marked way from the sea to the docks.

Abbott should live in an aeroplane. He was as happy as a sand-boy as we hedge-hopped, leap-frogged the sand dunes and skimmed the shores of Uruguay to Montevideo, where we arrived in about two hours. We were met at Mellija, the civil aerodrome, by the G.Q. agent, Mr. Juan Lagomarsino, and by Mr. Davis, the manager of Shell-Mex in Uruguay.

Arrangements were made for demonstrations to the army and navy at the military camp of Mendoza, and everything went off without incident. The school here

I noticed, is equipped mostly with French machines. My descents were to be the last for business purposes. However, the civil flying club at Mellija, the only such organisation in Uruguay, was holding an air display in aid of the hospital, and it was suggested that a parachute descent might help.

The public here had not seen a drop for over fourteen years; and didn't we know it! We had, unfortunately, left the parachutes on the aerodrome, and when we made our way by road to take part in the show, there were so many pedestrians and picturesque gauchos on horseback and hundreds of cars blocking the roads that we found it almost impossible to reach our destination. It appeared that the whole of Uruguay had turned out to see the display. We arrived eventually and went up in the Fox Moth for the drop.

It was useless to try to estimate the size of the crowd; it was simply colossal. As I landed the whole crowd made one wild rush. I had managed to complete the tour safely from the parachute point of view, but I certainly did not relish being trampled to death by this good-hearted but surging mob. Then I discovered, to my relief, what the swords worn by their police were for. With the aid of the flat of this sword, used in an appropriate manner, and charging up and down the crowd on their horses, the police managed to hold them back until the safety of the hangar was reached. Abbott, in the meantime, had been well occupied in saving people from being cut to pieces by the airscrew of the *Gavalin del Plata* and in stopping the machine being taken away in small parts by souvenir hunters. That was the last demonstration in Uruguay, and we returned to Argentina after a few days.

* * *

So ended my South American tour, and I sailed for home somewhat regretfully. It is a mystery to me that more British firms connected with the aviation industry do not send out representatives to tap this market. The South American is always willing to give your goods a fair show.

THE O.U.A.S DINES

Sir Philip Sassoon the Guest of Honour

THE Oxford University Air Squadron dinners are different from many other such annual affairs in that one is justified in looking forward as much to the speeches as to the dinner; because the atmosphere of the formal assembly for sherry beforehand changes at the proper moment after dinner to that of a merry party; and, lastly, because undergraduates have an opportunity to meet and discourse on even terms with many persons distinguished in the aeronautical world whose knowledge and especially experience are of the greatest value to them.

Last Friday's function took place at the Squadron's H.Q. in Oxford. Wing-Commander C. N. Lowe, the chief instructor, before welcoming Sir Philip Sassoon and the guests, said that all would wish him to mention Bruce of the Squadron, who had lost his life in a private flying accident the previous week. Commander Lowe then described Sir Philip Sassoon as a great friend and moral and practical supporter of the University Squadrons. He went on to thank Air Commodore S. W. Smith "for not interfering at Abingdon," and Sqn. Ldr. G. M. Knocker and the instructors for their help. Thirty-seven O.U.A.S. pilots were now in the Reserve, and after camp twenty-four more should be added to this number.

The Rt. Hon. Sir Philip Sassoon, replying, said that the existing Royal Air Force scheme was proceeding satisfactorily and that he looked to the Squadron to provide officers of the highest intellectual development to fill posts in an Air Force developing into a mighty power on which the Empire could depend. Cheers greeted his reminder of the significance of the fact that, for the first time, Estimates for the air exceeded those of the Navy. Sir Philip Sassoon congratulated the O.U.A.S. on their good progress, and wished them future prosperity.

Dr. W. T. S. Stallybrass, Principal of Brasenose College, made a characteristically witty speech in proposing "The Squadron," and Mr. P. C. W. Disney, whose speech in reply was, in truth, clever and much appreciated by his colleagues, likened the previous speakers to the three men in a boat—himself, as fourth, being the dog, for whom there was little justification or room.

Not everybody likes to have music on the menu, but when it is served up, as it was in this case, by the orchestra of H.M. Royal Air Force, who can complain?

MANX AIR RACE ENTRIES

AN excellent entry of twenty-six, including two from Germany, has been received by Capt. Rex Stocken for the Manx Air Races this week-end.

On Saturday, while Hanworth is awaiting a public invasion for its impressive Empire Air Day programme, the first competitor will leave at about 10 a.m. in the London-I.O.M. Race. On Monday, at approximately 3 p.m., the Manx Air Derby (over 60 h.p.) and the Tynwald Air Race (under 60 h.p.) will be flown; both will be over three laps of the island.

The official entry list appears below.

No.	Entrant.	Pilot.	Aircraft.	London-I.O.M. Race.	Manx Air Derby.	Tynwald Air Race.
1	Cunningham Holiday Camp ...	John C. Higgins ...	D.H.89, G-AENO	Yes	—	—
2	Wm. Robertson Porter	S. W. Sparkes ...	Vega Gull, G-AERH	Yes	—	—
3	A. Henshaw	Entrant (winner of last year's Ldn.-I.O.M. Race).	Mew Gull, G-AEXF	Yes	Yes	—
4	F. Hills & Sons (W. W. Greenfield)...	J. Shoesmith	Hillson Praga, G-AEUN	Yes	—	Yes
5	S. T. Lowe	Entrant	Comper Swift, G-ABWE	Yes	Yes	—
6	A. V. Harvey	Entrant	Miles Whitney Straight, G-AEVH	Yes	Yes	—
7	Carill Napier	Entrant	Hendy 302, G-AAVT	Yes	Yes	—
8	H. S. Horne	Flt. Lt. T. Rose ...	B.A. Eagle, G-ADID	Yes	Yes	—
9	E. D. Ward	Entrant	Tipsy S.2, ———	Yes	—	Yes
10	Miss Mabel Glass	Entrant	D.H. Moth, G-ABOE	—	Yes	—
11	British Aircraft Manufacturing Co., Ltd.	Flt. Lt. J. B. Wilson .	B.A. Double Eagle, G-ADVV ...	Yes	Yes	—
12	James Rush	Entrant	Aeronca, G-AELX	Yes	—	Yes
13	C. F. Hughesdon	Entrant	Miles M.5, G-ADNL	Yes	Yes	—
14	A. J. Walter	Entrant	Taylor Cub...	Yes	—	Yes
15	C. B. Field	Entrant	Hawker Tomtit, G-AEVO ...	Yes	Yes	—
16	Dart Aircraft, Ltd.	———	Dart Kitten, G-AEXT	Yes	—	Yes
17	P. Randolph	Entrant	Vega Gull, G-AEKI	Yes	—	—
18	C. H. Tutt	Entrant	D.H. Moth G-ABPK	Yes	Yes	—
19	Aero Club von Deutschland ...	Seidemann	B.F.W.108, D-IOSA	Yes	Yes	—
20	Aero Club von Deutschland ...	Ernst Gerbrecht ...	B.F.W.108, D-INKY	Yes	Yes	—
21	F. Hills & Sons (W. W. Greenfield) ...	———	Hillson Praga, G-AEEU	—	—	Yes
22	J. A. M. Henderson	Entrant	Monospar, G-AEPA	Yes	—	—
23	F/O. A. E. Clouston	Entrant	Hawk Major, G-ADGE	Yes	Yes	—
24	British Aircraft Mfg. Co.	H. J. Wilson... ...	B.A. Eagle, G-AERB	Yes	Yes	—
25	R. C. Hockey	Entrant	Aeronca, G-ADYR	Yes	—	Yes

This sketch map gives a graphic idea of the large number of military and civil aerodromes that will be open to the public next Saturday.

EMPIRE AIR DAY

Where and What to Watch Next Saturday

CORONATION visitors, as well as our own folk, will, next Saturday, have a better opportunity than ever before of appreciating the standard of Service flying and equipment in this country and the state of British civil aviation. The occasion is Empire Air Day, when over fifty R.A.F. stations and a wide selection of civil aerodromes will be opened to the public. The Day is under the auspices of the Air League, and the proceeds go to the R.A.F. Benevolent Fund.

The notes below give an indication of what may be expected. Following the guide, also, will be found some impressions of a typical display, gleaned at a rehearsal.

Prices of admission to most stations are one shilling for adults and threepence for children. The majority of the Service aerodromes will be open from 2 p.m. to 7 p.m.

SERVICE AERODROMES

ENGLAND.

BEDFORDSHIRE: *Henlow.*—Dive bombing; kite balloon ascents; gas attack; live parachute descent; fighters attacking bombers; handicap race; balloon bursting competition.

BERKSHIRE: *Abingdon.*—Dive bombing; anti-gas demonstration; technical sections of bomber squadron on view.

BUCKINGHAM: *Halton.*—School for Technical Training of Apprentices; Princess Mary R.A.F. Hospital and Institute of Pathology and Tropical Medicine; formation flying; aerobatics; display by massed drums and pipers.

CAMBRIDGESHIRE: *Duxford.*—Quick getaway by fighters; parachute testing; aerobatics with smoke; passenger flights in civil aircraft. *Sutton Bridge* (*nr. Wisbech*).—Bombing a moving car; attacks on towed targets.

CHESHIRE: *Sealand.*—Flying synchronised aerobatics; squadron air drill; drogue target towing; message picking-up; ground attack.

DEVONSHIRE: *Mount Batten* (*Plymouth*).—Flying by marine aircraft.

DURHAM: *Usworth* (*Castletown, Sunderland*).—Demolition of enemy fortress; fly-past; radio telephonic conversation with pilot in flight relayed by loud speakers; aerobatics; height guessing competition.

ESSEX: *Hornchurch.*—Synchronised aerobatics; attack on towed target; crazy flying; squadron air drill; aerobatics to R/T. orders; comic low bombing; height guessing competition; aerial combats; set piece. *North Weald* (*nr. Epping*).—Dive bombing; message picking-up; aerial combats; height judging; display by Woodford Model Aero Club; anti-gas demonstration.

GLOUCESTERSHIRE: *Filton* (*Bristol*).—Aerial gunnery; attacks on ground targets; passenger flights in civil aircraft.

HAMPSHIRE: *Andover.*—Formation flying with R/T. communication; aerobatics; low flying attacks and formation flying. *Calshot.*—Floatplanes in co-operation with landplanes; flying boats; destruction of "pirate junks." *Farnborough.*—Aerobatics by R.A.E. pilots; squadron air drill; picking up and dropping messages; converging bombing attack; combat between hostile aircraft and three two-seater fighters; attack on anti-aircraft battery. *Gosport.*—Flying by coast co-operation units. *Lee-on-Solent.*—Formation flying by landplanes, seaplanes and flying boats; firing at flag target; aerobatics; bombing formation in fight with Harts; destruction of oriental "pirate" junk. *Odiham* (*nr. Basingstoke*).—Aerobatics; one Gauntlet with R/T. communication; supply dropping and picking-up; fly-past; attack by "enemy" squadron; retaliation by anti-aircraft battery; attendance of gassed and wounded by V.A.D.s and St. John Ambulance. *Worthy Down* (*nr. Winchester*).—The work of bomber units.

HUNTINGDONSHIRE: *Wyton.*—Aerobatics by two aircraft of No. 139 (Bomber) Squadron; message picking-up by Audax; formation flying; balloon bursting; low bombing; synchronised aerobatics by Gauntlets.

KENT: *Biggin Hill.*—Low bombing; formation flying; individual aerobatics; R/T communications; seven types of aircraft on view. *Eastchurch.*—Work of the armament school. *Hawkinge* (*nr. Folkestone*).—Aerobatics; visitors will request machine to make evolutions by wireless; aerial battle between six Furies and nine Audaxes; bombing and machine gunning of aerodrome by surviving Audaxes; slow flying; supply dropping; fly-past by ten Furies and nine Audaxes. *Lympne.*—Formation flying; attack on towed target; low bombing; blind-flying instruction; dive bombing; synchronised aerobatics; parachute descent; fly-past by civil aircraft; camera obscura demonstration.

LINCOLNSHIRE: *Cranwell.*—R.A.F. Cadet College and Electrical and Wireless School; air display. *Grantham.*—Work of a flying training school. *North Coats* (*nr. North Thoresby*).—Bombing of "fort"; aerial gunnery; towed target. *Waddington* (*nr. Lincoln*).—Formation flying; aerial combat; set piece which

A Hawker Audax at the Northolt Empire Air Day rehearsal picks up a message strung between rifles. (*Flight* photograph.)

will probably include armoured cars and field guns: fly-past; anti-aircraft demonstration by 385th Battalion A.A. Battery, Lincoln.

MIDDLESEX: *Northolt.* — Defence against "air raid"; army co-operation.

NORFOLK: *Bircham Newton* (*nr. King's Lynn*).—Work of bomber units.

NORTHAMPTONSHIRE: *Peterborough.*—Formation flying; flying instruction; practice fire alarm; aerobatics on Fury.

NOTTINGHAMSHIRE: *Hucknall.*—Bomber and Auxiliary Air Force units; "dog fight"; converging bombing; flying in civil aircraft.

OXFORDSHIRE: *Upper Heyford.*—Attacks on tank; bombing practice; R/T. communication.

SURREY: *Kenley.*—Air battles; bombing attacks and radio telephony demonstration; anti-aircraft gunnery and searchlight; joy-riding.

SHROPSHIRE: *Tern Hill* (*nr. Market Drayton*).—Air combat between nine raiding aircraft and three Furies; aerobatics; blind flying; balloon bursting; squadron air-drill; synchronised aerobatics; message picking-up; handicap race; dive bombing; gas attack on car by three Harts; public will be admitted to gas chamber.

SUFFOLK: *Felixstowe.*—Flying boats, seaplane and amphibians; fifty-ton crane. *Martlesham Heath.*—Aerobatics; aerial combats; crazy flying; supply dropping; dive bombing; balloon bursting; handicap race. *Mildenhall.*—Aerobatics by Gauntlet with R/T. communication; supply dropping by Hendon; attack on Hendon bomber by three Furies; bombing display; formation flying; fly-past.

SUSSEX: *Tangmere* (*nr. Chichester*).—Formation flying; low flying attack; R/T. communication; flight and individual aerobatics; supply dropping and picking-up; air-drill by three or four complete squadrons; quick getaway; air combats; diving attack against troops.

WARWICKSHIRE: *Castle Bromwich* (*Birmingham*).—Dive bombing; gunnery practice; R/T. communication; Midland Aero Club co-operating.

WILTSHIRE: *Upavon* (*nr. Marlborough*).—Flying programme to show training of personnel; exhibition of instructional machines including Hart and Fury. *Old Sarum* (*Salisbury*).—Army co-operating and bombing aircraft; testing guns; "picture" target; Wiltshire School of Flying co-operating.

YORKSHIRE: *Catterick.*—Dive bombing; attack on heavy bomber by three Demons; height-judging contest. *Catfoss* (*nr. Hull*).—Attack on towed target; low bombing attack; supply dropping and message picking-up. *Thornaby.*—Destruction of dummy tanks by fighters; attack on towed target; battle between bomber and obsolescent fighter.

SCOTLAND.

ANGUS: *Montrose.*—Set piece; attack on "enemy" bomber; aerobatics by Furies; attack on towed target; picking up supplies.

FIFE: *Donibristle* (*Inverkeithing*).—Work of torpedo-bomber unit; attack on gun batteries; bombing a "fortress." *Leuchars.*—Flying school and armament training; catapult launching; twenty-eight events.

MIDLOTHIAN: *Turnhouse* (*Edinburgh*). Low-altitude bombing of armoured cars; camera obscura.

RENFREW: *Abbotsinch* (*Paisley*).—Aerobatics on Harts; parachute dropping; low bombing; aerial combat.

WIGTOWNSHIRE: *West Freugh* (*Stranraer*).—Aerobatics; dive bombing; aerial combat; attack on towed target.

IRELAND.

ANTRIM: *Aldergrove.*—Formation flying; R/T communication; individual aerobatics; fly-past; combat; set piece.

WALES.

PEMBROKESHIRE: *Pembroke Dock.*—Flying boats; R/T communication; attack on flying boats; R.A.F. seaplane dock on view; No. 1 Anti-aircraft Co-operation Unit will co-operate.

CIVIL AERODROMES

HOME COUNTIES.

MIDDLESEX: *Hanworth* (*Feltham*).—About twenty aircraft companies will co-operate and over thirty different types of civil aircraft, as well as visiting R.A.F. machines, will take part; aerodrome with the R.A.F. Reserve Training School open for inspection; start of London-Isle of Man air race. *Heston.*—Joy-riding facilities; visitors will be shown the normal activities.

BERKSHIRE: *White Waltham* (*Maidenhead*).—Civil Flying Training School will be visited by R.A.F. aircraft, which will take part.

HERTFORDSHIRE: *Hatfield.*—Visiting R.A.F. aircraft and the London Aeroplane Club will co-operate.

ESSEX: *Broxbourne.* — Flying by Herts and Essex Aeroplane Club.

SURREY: *Gatwick.*—One of England's newest and most modern civil aerodromes open for inspection; flights.

KENT: *Bekesbourne.* — Aerodrome open to public.

IN THE PROVINCES.

CUMBERLAND: *Carlisle.*—Display will be augmented by visiting R.A.F. aircraft; joy-rides.

CHESHIRE: *Hooton.*—Extensive display and passenger flying.

DEVONSHIRE: *Plymouth.*—Arrangements in hand for visiting R.A.F. aircraft to take part.

GLOUCESTERSHIRE: *Bristol.*—Visiting R.A.F. aircraft will take part in the programme; tours of inspection.

HAMPSHIRE *Hamble.*—The display

The air raid alarm is sounding as pilots run to their Gloster Gauntlets, already being started by the ground crew. (*Flight* photograph.)

will be given in co-operation with visiting R.A.F. aircraft; the civil flying training school open for inspection.

LANCASHIRE: *Barton.*—Conducted tours of aerodrome, and a display.

LEICESTERSHIRE: *Desford.* — Aerodrome open together with civil flying training school; display by visiting R.A.F. aircraft.

NORTHAMPTONSHIRE: *Sywell.* — Aerodrome open; visiting R.A.F. aircraft.

OXFORDSHIRE: *Witney.*—Aerodrome open.

SOMERSET: *Weston-super-Mare.*—R.A.F. aircraft will visit the aerodrome; passenger flights.

SUSSEX: *Shoreham.* — Passenger flights; South Coast Flying Club will co-operate in the arrangements. *Wilmington (Eastbourne).*—Open for inspection; flying events will include joy-rides.

STAFFORDSHIRE: *Stoke-on-Trent.*—Aerodrome open; North Staffs Aero Club will co-operate. *Walsall.*—Aerodrome open and R.A.F. participation.

WARWICKSHIRE: *Whitley.*—Display by Coventry Aeroplane Club; demonstrations by instructors from Air Service Training, Ltd., Ansty Aerodrome.

YORKSHIRE: *Doncaster.*—Doncaster and Sheffield aero clubs are putting up a "non-stop" air display in which R.A.F. aircraft will co-operate; joy-rides; Territorial Army units will demonstrate. *Brough.*—Open to the public; support will be given in the display by visiting R.A.F. aircraft. *Hull.*—Flying events will include passenger flights; Hull Gliding Club will join with the Hull Aero Club in the display. *Yeadon.*—Yorkshire Aeroplane Club will provide a display; joy-rides; tours of inspection.

A REHEARSAL CAMEO

ALMOST everybody must have noticed the increased activity at R.A.F. aerodromes all round the country, but not so many will have realised that it is chiefly for the public that hours of practice are being put in. Fine weather, the R.A.F. Display and Empire Air Day are the three chief reasons.

Let us take as an example Northolt aerodrome. Many Londoners will have noticed a big flying field along one edge of Western Avenue; they may even have been able to pick out two-seater Hawker Demons of No. 23 (F) Squadron and single-seater Gloster Gauntlets of No. 111 (F) Squadron, which are to take part in several of the eighteen events of next Saturday's programme. Opening the meeting with a "zoom," a single-seater Hawker Mk.II Fury will give a display aerobatics—rolling, diving, looping at speeds between 250 and 300 m.p.h.

Later nine Gauntlets will drill in the air and a Hart trainer carrying "instructor" and "pupil" will show the efforts of a backward learner to acquire aerobatic ability.

At last Monday's rehearsal a flight of "enemy" Demons were seen in the distance; a syren sounded and the ground crew rushed out to start up the defending fighters. The pilots ran out, hastily donning parachute harness, and were off and up to engage the raiders within a few minutes of the warning.

There followed interesting demonstrations of message picking-up and complementary supply-dropping by parachute, and of aerobatics directed from the ground by anyone nearby who fancied addressing the microphone.

And now imagine yourself for a few minutes as gunner in a Demon in event 14—a low-flying attack on a ground force—an experience in which a *Flight* representative was privileged to share. At about 5 p.m., with engine ticking over, you struggle with Sidcot, parachute harness and helmet, arrange and plug in wireless earphones and mouthpiece (which are part of the helmet), do up the various clips and straps, pull down and fix goggles, attach the safety wire to a ring in your harness and then stand or sit tight. A few crackles through the earphones and the O.K. signal is heard, followed by a command to taxi out for take-off. The pilot manœuvres out with a few bursts of throttle and the machines collect in formation. The word is given and almost instantly you are forced back against the gun ring by the air blast. Then the ground drops away behind and the silver shapes of the other machines can be seen rising and falling gently on each side.

After gaining height and cruising round for a few minutes in formation one perceives two specks moving across the aerodrome below. Again a crackle in the earphones: straight line side-by-side formation is taken up, and warning to prepare to dive from one or other side is given. But not until it seems that the aerodrome, some 4,000ft. below, is immediately underneath does the order to dive come through. At once the outside left machine of the line banks over, drops its nose and streaks almost vertically earthward. Each machine does this in turn from the left. When your turn comes the pilot opens his throttle, you are whirled over and almost upside down, the wind pressure becomes terrific and the whole aircraft vibrates.

When it seems that you must inevitably hit the supply transport that are the target the pilot pulls out at well over 200 m.p.h.; you are forced down into the cockpit and no breath will come at first, but as the speed lessens in the climb and you look back over the tail to see a rapidly diminishing enemy force down on the aerodrome, all seems normal again. At the top, up and over goes the machine and down with the nose again, pointing at the dots below—the same roar and rush of air and vibration, the same pressure as you pull out, the hot smell of oil from the engine, and the nearly vertical climb. This continues for some minutes, during which the thrill and nervous tension prevents any thought other than an animal desire to set your teeth and machine-gun into Eternity the specks on to which you are diving. Then as suddenly as the attack commenced you draw off and rejoin formation, floating around aloft. After a couple of circuits the Demon glides gently in to land in perfect formation with its fellows.

Perhaps we have been a little unfair in drawing this picture of an Empire Air Day demonstration from an angle which will not present itself to the public; but if we have succeeded in tickling at least one young enthusiast's palate for such spectacles we shall not have written in vain; and in any case next Saturday's visitors will have unprecedented opportunities of making really close acquaintance with Service aircraft on the ground.

HIGH SPEED, LONG RANGE, HEAVY LOAD: The Armstrong Whitworth Whitley, ordered in large quantities for the R.A.F. The engines of this machine, which Flt. Lt. Turner-Hughes recently flew for *Flight's* photographer, are at present 795 h.p. Siddeley Tiger IXs, and D.H. v.p. airscrews are fitted. Other photographs appear on pages 527 and 536.

COMMERCIAL AVIATION

— AIRLINES —— AIRPORTS —

THE WEEK AT CROYDON

Schooling : Overcrowding : Sleeping Out : Scheduled Arrival : Overweather

SENIOR Imperial Airways pilots are all getting the good old Avro 652 on their tickets—that is, such of them as have been too busy to bother about it up to now.

This machine is used here for training Imperial school pupils, and the flying training used to be mainly in Capt. Walter's hands. He was recently appointed Assistant Air Superintendent, and it is said that other senior pilots will now undertake the training work. It is interesting that K.L.M. junior pilots are all "passed out" by various senior airline pilots rather than by a whole-time instructor —an extremely practical system.

Midnight Arrival

Last week the Dutch company inaugurated what is, I believe, the first passenger service to arrive at Croydon at midnight. Saturday's and Sunday's arrivals were exactly to schedule: 0.00 hrs. Passengers reach London at a somewhat depressing hour when, incidentally, the brightly lit and bustling K.L.M. Horseferry House office will strike a cheery note in an otherwise desolate city where you can't get a drink unless you know where to go by some occult instinct, and only then if you agree to eat a three-ply sandwich with a middle layer constructed of teak. K.L.M., by the way, has a new and attractive coach, very similar to the big ones used by Imperial Airways. The internal decoration is luxurious, and there is heating—very necessary in winter, and by no means to be despised either at something after midnight on chill summer evenings, or at 6.10 a.m. when the first of the day's passengers leave London. So well-heated, too, are the modern transport aeroplanes that a cold coach journey to town is the more intolerable by contrast.

Prospective Removals

British Airways have, I hear, already felt the benefit of the removal of the Railway Clearing House ban, and the big London agents are showing considerable interest in their bookings. There are persistent but unconfirmed rumours that British Airways find Croydon too cramped in the matter of hangarage and office accommodation, and that they will be moving once again. Probably the move would be a wise one, otherwise we might contract that form of disease with which too many fowls using one bit of ground are afflicted. If Imperial Airways also move, a provident and foreseeing Air Ministry will be able to pat itself on the back and remark, "There you are, plenty of room, you see!" As things are, you can't get an office at all at Croydon, and hangar accommodation is an acute problem.

Is it not time, by the way, that all aeroplanes were like the Junkers, which only require a couple or three ringbolts set in concrete as accommodation for the night? As a matter of fact, most all-metal types would be all right in the open, but aeroplanes, like the domesticated jungle fowl, have acquired the hen-house habit.

British Airways find that a 1hr. 30min. schedule can be maintained in almost all wind and weather conditions on the London-Paris route with their Electras, and I have heard talk of sticking firmly to that schedule day in, day out, and eschewing the empty honour of "tail-wind records," which merely land passengers in places far too early for their appointments. Air transport people have always been inclined to say (like the old sailing packets) that they will "arrive at such-and-such a time, wind and weather permitting," which is entirely the wrong way to look at the matter. Reserve power should not be used, surely, to boost up a schedule which can only be kept in favourable weather. I am sure exact arrival time is nearly as important as exact departure time, and the first company which sticks to an arrival schedule should have the full support of the travelling public.

Freight has been brisk lately. The Coronation issues of newspapers surprised many firms by weighing about three times as much per copy, so that the regular daily load of so many copies was unexpectedly heavy. Strawberries from France and Holland have been coming in regularly, and the other day I heard a well-satisfied customer crooning over some rare orchids which had come through in about six days from Java. Blue and white Lircons, which I thought were birds, also arrived by air and proved to be some precious stones.

Something New to Sell

Possibly the Greeks had a word for it, but we have none to describe that most important aspect of air travel known as flying above the clouds. The Americans have a word or, rather, a couple of words for this—or for semi-stratosphere flying—which strikes me as an admirable slogan. "Overweather flying" they call it, and it is a mystery to me why every publicity man of every airline in Europe has not worked out a similar slogan. It is all right to sell speed and safety, but in "overweather flying" air transport people have an article to sell which is unobtainable elsewhere. Regular overweather travel means virtual elimination of travel sickness. Progress in this line by shipping people has advanced from a skin-clad aborigine offering the coracle traveller a coarse earthenware bowl to a suave steward offering him or her a beautiful spode one. The victim suffers the same agonies as his prehistoric prototype. When travelling over clouds you can hold a brimming bumper knowing that the contents will be applied internally and not be distributed all over your sartorially perfect exterior. Again, even in winter air, travellers have a warm sun and blue sky when less enterprising people are hooting outside harbours or travelling over a bombardment of fog signals.

A. VIATOR.

North Sea Preparations

ALLIED AIRWAYS (GANDAR DOWER), LTD., made their first experimental flight from Necastle to Stavanger, Norway, on Saturday of last week in preparation for the regular service which they hope to operate later in the summer. Everything appears to have gone off according to plan, and the landing was, of course made, at the new airport at Sola.

The machine used was a D.H. Rapide—preparatory to the delivery of the 86B—and Mr. E. A. Starling was the pilot. In addition to a radio operator and ground engineer, Mr. Gandar Dower and Miss Brunning were carried. The original plan was to fly fram Stavenger to Oslo to meet civic authorities and the representatives of D.N.L.

Commercial Aviation

Thousandth Outward

ON Saturday the thousandth passenger and air-mail Empire flight was started from Southampton. This service is the 450th to Central and South Africa and the 254th to Australia. Each has been developed in stages as the ground organisation became more complete.

Aeromaritime Extension

AEROMARITIME, which operates the air mail service along the West African coast from Dakar and connecting with the Air France South American service, has now extended its line as far as Pointe Noire in the Congo. The service started on March 1 from Dakar to Cotonou in Dahomey. The inaugural flight of the extended service left Dakar on May 17, reaching Pointe Noire four days later. The service is operated by two Sikorsky S43s, one based at Dakar and the other at Pointe Noire.

The Antibes Accident

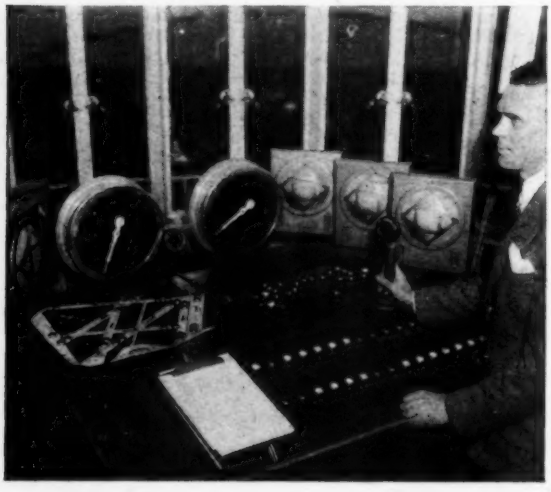
FOLLOWING the death of her most experienced South Atlantic pilot, M. Mermoz, and, previously, the loss of the big Latécoère *Lieutenant de Vaisseau Paris*, the accident to France's Lioré et Olivier flying-boat last week was an almost unbelievable stroke of bad luck. Of two machines designed especially for South Atlantic operations, the LeO had been the most successful on test, and five more had been ordered by Air France.

Apparently one of the outboard floats became detached immediately after the take-off and, possibly owing to consequent control derangement, the machine struck the water heavily and later caught fire. Among the five victims was M. Bourdin, the test pilot.

Figures from Canada

FIGURES given by the Department of Transport show that Canada carried 1,159,834 lb. of mail in 1936—a new record. This mail was carried into regions served by no other mail transport, and on a few inter-city runs.

At the same time the Department reports that at the end of 1936 there were 559 private, 380 commercial pilot, sixty-five limited commercial pilot and forty-two transport pilot licences in force, as well as 533 engineers' certificates. There were forty-three private machines, 402 commercial machines and ninety-eight airports. Light airplane clubs had a membership of 2,492, used sixty-six machines, and had 645 members under instruction. The machines flew a total of 17,324 hours, a record for the nine years in which the clubs have been in existence.



ON THE OTHER SIDE: Interesting as an example of control tower layout in the U.S., this photograph shows Lt. R. McL. Aldworth, the Superintendent, in the tower at Newark Airport, New Jersey. In front of him can be seen wind speed and direction indicators, a runway and flood-lighting "model" and the loudspeakers which are part of the local traffic control system.

Through to Durban

ON May 22 the first through flying-boat service on the African route was completed when the Short *Cambria* arrived at Durban and tied up at temporary moorings to the north of Salisbury Island. The exact location for the future base is still a matter for conjecture.

On the following day, incidentally, *Cassiopeia* broke the existing "record" by flying from Egypt to England in 18 hours on the normal service. Refuelling halts were made at Athens, Brindisi, Rome, and Marseilles, and the flight was carried out on normal lines.

Surely Shod

TO say that the Dunlop people have been faced with some new problems in making the tyres for the Armstrong-Whitworth Ensigns would not be strictly true, for they have produced outsize aircraft tyres for years. Nevertheless, the dimensions of the Ensigns' footwear are certainly impressive—6ft. 6in. overall diameter and 2ft. 3in. thick. The weight of air contained at 40 lb. sq. in. is approximately 10 lb. for each tyre. A 10-ton ladle was required for pouring the steel for the tyre-mould castings.

Navigational

BETWEEN July 12 and 15, and on one other day of which candidates will be notified, an examination for First Class Air Navigators will be held, provided that a sufficient number of applications are received. On the first two days of the same period Second Class Navigators' examinations will be held; October is the month fixed for further Second Class examinations.

Application forms and general conditions can be obtained from the Secretary, Air Ministry (C.H.3 (a)), Ariel House, Strand, W.C.2.

Protecting the Industry

FOR some time it has been obvious that a society for mutual protection and co-operation in the air transport business would eventually be necessary. Though still very much in the preliminary stages, such a society has now been formed and known as the Aircraft and Airways Operators' Society of Great Britain and Ireland. Its objects, in the words of the company registration, are "to promote and protect the interests, financial welfare and success of the aircraft operating, and air travel and transport industry, and to devise means to promote co-operation among those engaged . . . . for their mutual interests."

The management is vested in a council of not more than twenty members, and the present signatories include Capt. W. A. Rollason (Rollason Aircraft Services), Capt. H. Duncan Davis (Brooklands Aviation), and Messrs. C. O. Powis (Phillips and Powis Aircraft), W. C. Laidlaw (Malling Aviation), F. J. V. Holmes (Air Travel), F. A. I. Muntz (Airwork) and W. Ledlie (Personal Airways). Altogether a fairly representative number of people connected with different branches of the business—and not mere figureheads, either.

Opening Up Siberia

Forty Thousand Against the Arctic, by H. P. Smolka. (Two maps and 53 illustrations.) Hutchinson, 12s. 6d. net.

TO those accustomed to regard Siberia as a bleak, useless waste, fit only for the incarceration of prisoners in its salt mines, Mr. Smolka's book offers its first surprise. This vast, inhospitable land is, in fact, naturally wealthy, to an extent almost beyond belief, in timber, minerals, water power; in fact, every imaginable commodity.

Why, then, has it never been developed? Because geographically it is a freak. It is inaccessible. All its vast rivers point to the Polar seas.

But in a new age a new answer has met the problem. The aeroplane has suddenly altered the old difficulties. As one reads this fascinating story of a terrific enterprise, one slowly becomes aware that all the time in the background is the roar of aero engines, without which nothing could have been done.

For those with a love of reading about new places and new people this is a superb book. Not the least interesting among the "new people" are the Soviet pilots, and there is a glimpse given to the reader of General Nobile, exiled Fascist, happy in his Moscow flat planning a dirigible fleet for the U.S.S.R.

If Mr. Smolka had been either a Russian or pro-Soviet, the book might have become wearisome at times. As he is neither, one feels that his pictures are authentic. His command of English is almost faultless, but one could have wished for some of the illustrations to be a little clearer.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

TWO hundred and fifty aircraft will take part in a massed fly-past at this year's R.A.F. Display, to be held June 26. At the Jubilee Review at Duxford two years ago only 155 machines participated.

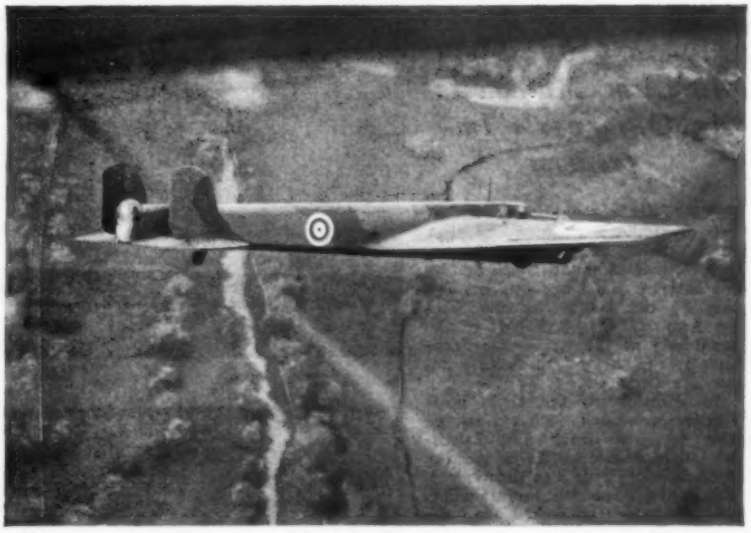
What is believed to be a new world's altitude record for gliders was set up by Herr Stenig, who, in a competition at Grunau, Silesia, reached a height of 19,600 ft.

After a comparatively leisurely trip the Mitsubishi monoplane *Divine Wind* is back in Japan. Mr. Masaaki Iinuma and Mr. Kenji Tsukagoshi were received last Saturday by the Emperor, who was deeply impressed with their achievement.

A four-wheeled undercarriage is fitted to the new Boeing XB-15 bomber for the U.S. Army Air Corps. In general layout the machine resembles the YB-17 now going into service, but is much larger, having complete living accommodation on board, and is powered with four Pratt and Whitney Twin Wasp engines.

This evening Professor von Karman, of Pasadena University, California, will deliver to the R.Ae.S. the twenty-fifth Wilbur Wright Memorial Lecture. His subject is "Turbulence." The lecture will be given at 6.30 p.m. at the Institution of Electrical Engineers, Savoy Hill, London—not at the Science Museum as in the past.

Professor von Karman will begin by defining turbulence, giving examples and general causes, followed by the mechanism of diffusion, and examples of turbulent exchange. He will show how turbulence works for and against the aeronautical engineer.



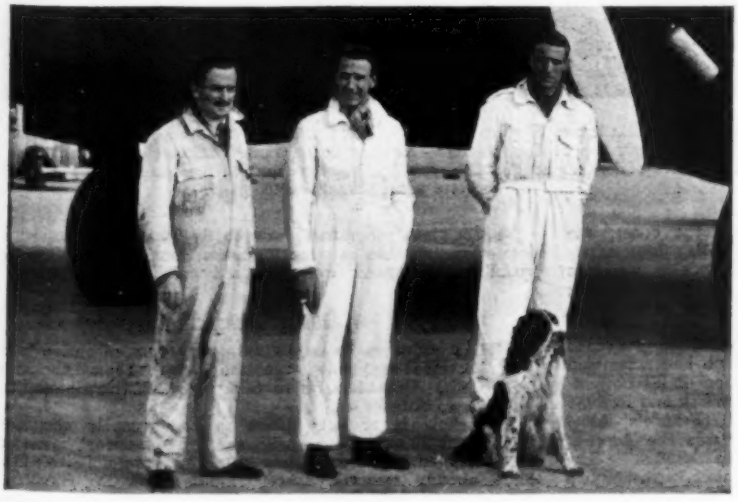
ON HER BEAM ENDS: Flt. Lt. Turner-Hughes demonstrates the manœuvrability of the Armstrong-Whitworth Whitley heavy bomber. It can be seen that the camera was aimed almost vertically at the ground. (*Flight* photograph.)

Flying Officer David Llewellyn left Croydon last Thursday morning in an attempt to break the Cape-and-back record, but was back again at Croydon in the evening with airscrew trouble after being in the air for nearly six hours. He restarted on Monday, and is well on his way as we go to press.

A special Lockheed Electra has been delivered to the U.S. Army Air Corps for high-altitude research. It has a fuselage with a sealed cabin and two radial engines with exhaust-driven superchargers.

The Duke and Duchess of Kent flew through very bad weather to Lympne on Saturday to visit Shorncliffe Camp, where they were the guests of the 2nd Battalion, Queen's Own Royal West Kent Regiment.

A squadron of ten Hawker Furies, with multi-guns and Rolls-Royce Kestrel XVI engines, has been delivered to Jugoslavia. The Jugoslavian Government has obtained a licence to build further Furies in their factories, and 75 Kestrel XVIs have been ordered. The Jugoslavian Fury climbs to 20,000ft. in eight minutes and has a maximum speed of 250 m.p.h.



THREE MEN AND A DOG . . . The A.W. test team which put the Whitley through its paces for *Flight's* photographer (left to right): F/O. E. S. Greenwood, Flt. Lt. C. K. Turner-Hughes, and Flt. Lt. R. C. Reynell. To finish the quotation would cast most unjust aspersions on the Whitley's undercarriage.

Twenty-five Years Ago

(*From "Flight" of May 25, 1912.*)

"His Majesty King George V during the past two or three weeks has seen wonders that no sovereign, living or dead, has ever witnessed in the world's history. He has been at sea in command of one of the most powerful squadrons of ships of war ever gathered together for tactical exercises under a single flag, and in the course of that cruise he has seen his naval flyers performing marvels of flight, under all sorts of conditions of weather."

AT THE NAVAL REVIEW

Fly-past by Fleet Air Arm Machines : An Observer's Impressions

FOR the aeronautically enthusiastic the climax of last Thursday's review of the British fleet at Spithead by His Majesty the King was the fly-past by the aircraft of the Fleet Air Arm. The greater part of the naval side of the Royal Air Force took part in this extraordinarily impressive ceremony.

In addition to the three Fleet Fighter squadrons, and four squadrons each of Shark and Swordfish torpedo-spotter-reconnaissance aircraft, there were also the Walrus, Shark, and Swordfish aircraft which are normally embarked in the various battleships and cruisers.

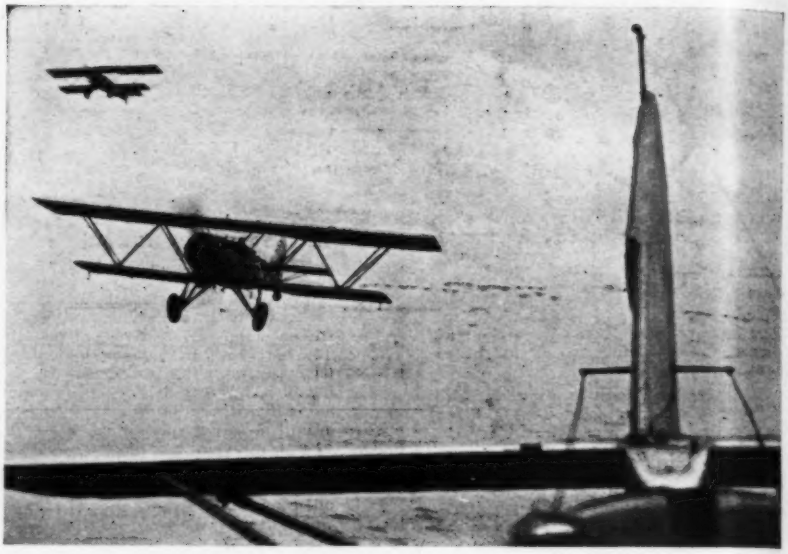
It was the writer's privilege to be given a seat in one of the Shark ship-planes participating, No. 810 squadron from H.M.S. *Courageous*, preceded by Nos. 811 and 822 squadrons (H.M.S. *Furious*), and 812, 823, and 825 squadrons (H.M.S. *Glorious*), took-off from Gosport aerodrome, led by Vice-Admiral N. F. Laurence, C.B., D.S.O. (Vice-Admiral Commanding Aircraft Carriers), in a Blackburn Shark.

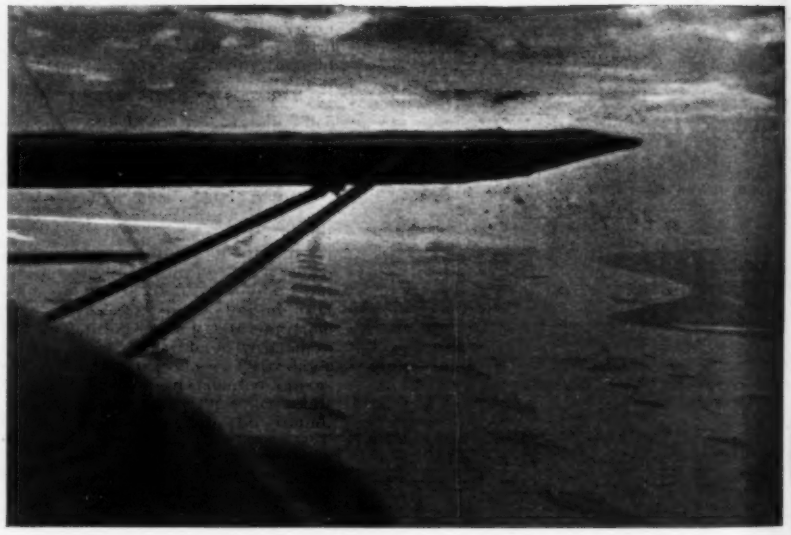
Flying inland to get into wing formation, the squadrons then proceeded eastwards and were joined by No. 821 squadron (H.M.S. *Courageous*), from Lee-on-Solent; Nos. 800, 801, and 802 Fleet Fighter squadrons and 820 squadron from Eastleigh and the seaplanes from Calshot.

The difficulties of station-keeping by a number of aircraft of different types and speeds was accentuated by low cloud and poor visibility.

The coast was crossed near Bognor, and then, flying westwards along the coast, the formations passed to the south of Selsey Bill. Soon afterwards the four main lines of British and foreign warships appeared out of the haze, stretching from Spithead along the Solent, and flanked by smaller craft, ships of the Merchant Navy, fishing vessels and yachts.

Passing to the northward of the Royal Yacht, we proceeded over this vast gathering of naval might which had assembled to pay tribute to His Majesty on the occasion of his Coronation. To the south of our great battleships *Nelson* and *Rodney* were the *New York* and the *Dunkerque* (France's latest battleship), whilst opposite the *Resolution* was the *Admiral Graf Spee*, one of the German "pocket battleships." The distinctive lines of a Japanese 10,000-ton cruiser, with her two seaplanes on catapults, stood out prominently. Almost opposite were the British aircraft carriers *Glorious*, *Courageous*, and *Furious*, succeeded by our two new 9,000-ton cruisers *Southampton* and *Newcastle*, and the aircraft carrier *Hermes*, lately returned from the Far East. After these ships came the destroyers of the Home and Reserve Fleets.





(Top) Two Blackburn Sharks of the T.S.R. squadrons. Coming up astern is an impressive formation of fleet fighters—Hawker Ospreys and Nimrods. (Lower picture) "Long lines of British and foreign warships appeared out of the haze." The aircraft carriers are distinguishable.

The original programme was to fly-past first in squadron formation and then in wing formation, but, owing to the bad visibility, the former was dispensed with. AERONAUTILUS.

A Dutch Aero Show

WHAT promises to be an extremely comprehensive international aero show, organised with the typical thoroughness of the Hollanders, is to take place at The Hague from July 30 to August 15.

The show is to take place in the recently completed "Houtrust" exhibition hall near the seaside resort of Scheveningen. The organisers state that several British firms have already reserved space, among them De Havilland, Bristol, and Rolls-Royce. The Dutch aircraft industry, of course, will be present in full strength.

It is intended to make the exhibition a bi-annual one, alternating with the Paris show.

Details are obtainable from the organisers at 'S-Gravenhage, Houtrustweg 108.

May 27, 1937.

Supplement to FLIGHT

The AIRCRAFT ENGINEER

"FLIGHT" ENGINEERING SECTION

No. 136 (Volume XIV No. 5) 12th Year

May 27, 1937.

A FULLY FEATHERING AIRSCREW

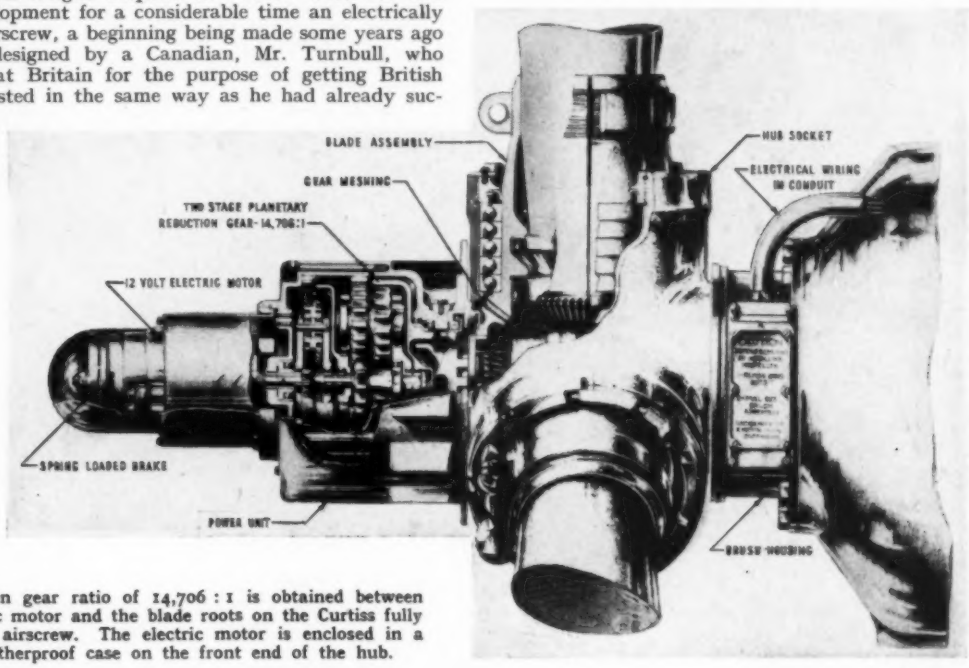
Details of the Curtiss-Wright : 120 Degrees Angular Range : Electrical Operation

As the speed range of aircraft increases, the need for airscrews of the variable pitch type with a very wide angular range becomes greater and greater.

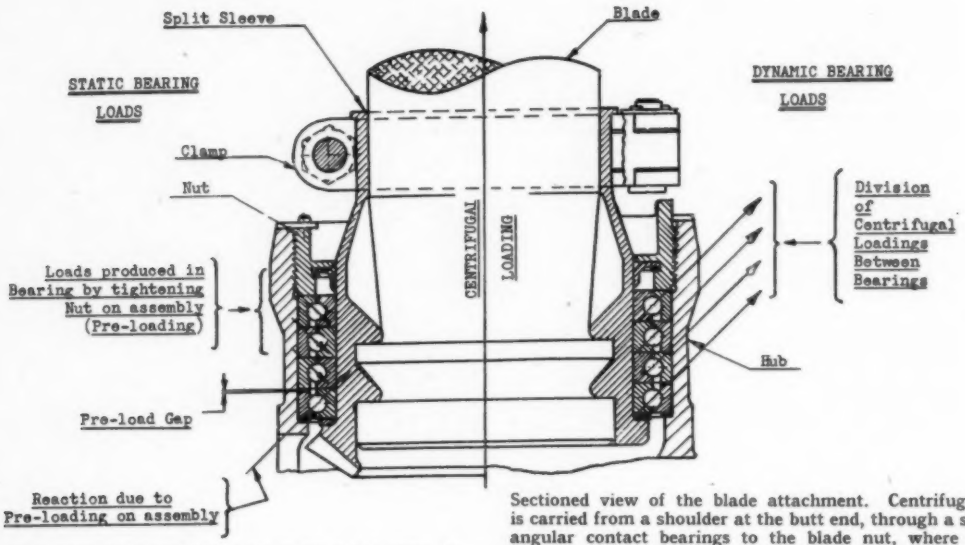
To prevent possible further damage to an engine which has broken down on a multi-engined aircraft, it is desirable to be able to stop the engine completely by turning the airscrew blades "edge on" to the air stream; furthermore, the airscrew blades of the remaining engine or engines should be capable of being set to the most efficient angle so that the fullest use can be made of the remaining power.

The Curtiss-Wright Corporation of New York has had under development for a considerable time an electrically operated airscrew, a beginning being made some years ago with one designed by a Canadian, Mr. Turnbull, who visited Great Britain for the purpose of getting British firms interested in the same way as he had already succeeded in disposing of his licence to the American company. To the best of our knowledge, Mr. Turnbull was not successful, but it is interesting to find that his pioneer work has borne fruit on the other side of the Atlantic.

One advantage of electrical pitch control is that the method is very flexible and permits of either constant speed or selectve manual control being used in the same installation. Under selective manual control any blade angle between the low-pitch limit setting and the "feathered" angle may be obtained and maintained independently of engine conditions and at the will of the



A reduction gear ratio of 14,706 : 1 is obtained between the electric motor and the blade roots on the Curtiss fully feathering airscrew. The electric motor is enclosed in a weatherproof case on the front end of the hub.



Sectioned view of the blade attachment. Centrifugal load is carried from a shoulder at the butt end, through a stack of angular contact bearings to the blade nut, where special buttressed threads transfer it to the hub barrel. The arrows on the left illustrate "preloading" conditions, those on the right the dynamic loading conditions.

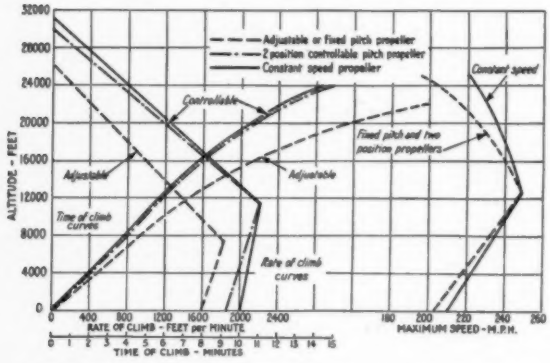
pilot. At any operating condition airscrew pitch may be fixed for magneto checking, mixture adjustment, and performance checking.

The Curtiss hub is readily adaptable to hollow steel or aluminium alloy blades, and imposes no restriction on blade angle movements as great as 120 deg., which is sufficient to cover all conceivable requirements. The pitch-actuating mechanism is completely enclosed and protected against temperature, moisture, and ice formation.

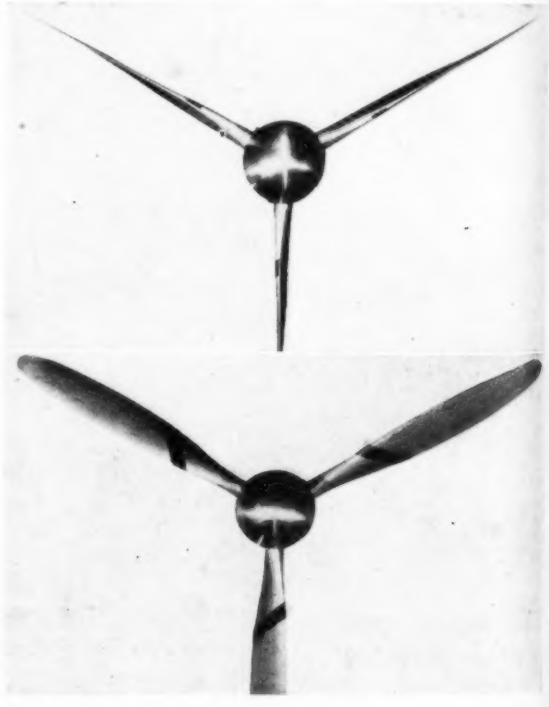
The hub proper is of the one-piece type, machined from a high-strength alloy steel forging. On its rear extension is mounted the slip ring assembly which transmits electrical energy from the stationary brushes to fixed contacts at the front face of the hub. Suitable crankshaft nut, adapter and locking means are provided for ready installation on the standard airscrew shaft.

The fixed brush assembly consists of a pair of spring-loaded carbon composition brushes for each slip ring, mounted in a block of insulating material and supported by a light alloy casting bolted to the thrust cover of the engine nose. This casting completely houses the electrical parts and serves to seal and protect the parts from the effects of moisture, dust, and other foreign matter. To insulate against shock and vibration, the brush block is supported in its housing on special rubber bushings. Leading into the housing is a standard conduit fitting.

The centrifugal load of the blade is carried from a shoulder at the butt end through a stack of angular contact bearings to the blade nut, where special buttressed threads transfer it to the hub barrel. The one bearing at the inner end is reversed for taking the "preload" when the blade nut is tightened to eliminate play from the bearing stack. The sectioned view shows the "parallel" action of the angular contact bearing in distributing the



Advantages of Curtiss constant-speed airscrew as shown by performance curves of a typical American military aeroplane.



Two views of the Curtiss fully feathering airscrew. In the lower picture the blades are set at a fine-pitch angle, while in the upper they are seen in the "feathering" position.

load evenly between the several bearings of the stack. The arrows on the left side of this figure illustrate the loading condition imposed by the preloading, while those on the right hand represent the distribution under dynamic loading conditions.

When hollow steel blades are used the bearings are mounted directly on the accurately turned shank of the blade. For standard-shank aluminium alloy blades a split sleeve with standard clamp is provided for mounting the bearings and retaining the blade.

Pitch change is effected by means of a power unit consisting of a small series-wound reversible direct-current electric motor operating through a two-stage planetary speed reduction unit to a bevel power gear which engages a bevel gear fixed to the root of each blade. A spring-loaded, no-voltage solenoid brake, series connected with the motor, is provided at the forward end of the electric motor to stop and prevent pitch change due to coasting, vibration, or other causes when the motor fields are not energised.

The power unit assembly is located on the forward face of the hub by a pilot surface and is secured in place by six cap screws through the flanged face of the speed reducer housing. Four spring-loaded electrical contacts at the face of this flange match with the fixed contacts on the hub face to complete the electrical circuit from the slip rings to the motor.

The normal pitch range of the blades is controlled by electrical cut-out switches operated by a cam on the shaft with the power bevel gear. This range is usually made to cover the full requirements of normal flight, from take off to maximum gliding descent speed. The number of teeth on the power gear and the number of splines on the power gear drive shaft differ, so that by a simple process of indexing the range of the limit switches may be readily shifted to accommodate properly the take-off rating of various engines. Blade angles outside the normal flight range, such as "feathering," are obtained at the will of the pilot by means of the manual control switch which by-passes the cut-out limit switch. Provision is made on the hub for mounting the conventional type de-icing spinner and slinger ring equipment.

The constant-speed control consists of a conventional flyweight-type governor driven at approximately engine speed. The flyweight force is balanced against a spring, the initial compression of which may be adjusted by the pilot in selecting the desired engine speed. While the speed is balanced, the pitch-changing circuits are open and no change takes place. When the speed is above or below that desired, the flyweights through a plunger actuate a switch to close the increase or decrease pitch circuit and effect the necessary correction. The governor is adaptable to either mechanical or remote electrical control from the cockpit.

A Curtiss electrically controlled fully feathering airscrew on a geared Wright Cyclone in a Navy Consolidated Patrol flying boat. These airscrews were used on the record mass formation flight from San Diego to Hawaii.

The development of the Curtiss constant-speed feathering airscrew has been in process for a number of years. During this time more than 1,000 hours of block testing have been accomplished, most of which has been done in conjunction with the Army Air Corps and the Navy Bureau of Aeronautics. In addition, large numbers of these airscrews are now in military service use in America. Such installations include the Army's Consolidated PB-2A two-seat Pursuit, the B-10B Martin Bomber, and the Navy's twin-engine Consolidated patrol boats. These installations have accumulated well above 20,000 hours of service use, and have demonstrated the reliability, safety, and efficiency of the airscrew.

TECHNICAL LITERATURE

SUMMARIES OF A.R.C. REPORTS

REPORTS published by His Majesty's Stationery Office, London, which may be purchased directly from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, W.C.2; 120, George Street, Edinburgh; York Street, Manchester, 1; St. Andrew's Crescent, Cardiff; 15, Donegall Square West, Belfast; or through booksellers.

FULL SCALE TESTS OF THE HENDY HECK (WITH AN APPENDIX GIVING PILOT'S NOTES). By A. E. Woodward Nutt, B.A., and P. A. Hufton, M.Sc. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1719. (18 pages and 12 diagrams.) January, 1936. Price 3s. net.

The Heck is a small heavily loaded low-wing cabin monoplane with slotted flaps, wing tip autoslots and a retractable undercarriage. Brief aerodynamic tests were required, primarily to find the effect of the slotted flaps on the aerodynamic characteristics and take-off and landing qualities of the aircraft.

The lift, drag and attitude curves for the aircraft were obtained and some take-offs and landings photographed, with flaps up and down. The effect of the flaps on stability and control was examined qualitatively. The maximum level speeds and stalling speeds in various conditions were measured. A few tests were made with the autoslots locked shut.

The flaps reduce the stalling speed from 57 m.p.h. to 52 m.p.h., and increase the maximum lift coefficient from 2.01 to 2.36 when the undercarriage is exposed.

The wing tip autoslots cause remarkable increases in $C_{L max.}$ These amount to 0.58 with flaps down and 0.70 with flaps up. $C_{L max.}$ occurs in both cases at incidences of the order of 35 deg.

The best gliding angle of the aircraft with undercarriage retracted is increased from 5.8 deg. to 7.8 deg. by lowering the flaps. With undercarriage exposed and flaps up the gliding angle is 7.6 deg., and lowering the flaps increases this to 8.5 deg. only. At speeds below the best gliding speed, flaps down, the gliding angle is steeper with flaps up than with flaps down.

The flaps decrease the landing run by 26 per cent., and the distance to come to rest after clearing a 50-ft. obstacle by 30 per cent. They are light and easy to operate, but owing to the small variation in gliding angle they cause when the undercarriage is down, they are not very effective in controlling the approach glide.

The take-off distance is decreased by 31 per cent., and the distance from rest to clear a 50-ft. obstacle by 33 per cent. if the flaps are used fully down.

On lowering the flaps in level flight the aircraft goes into a steep dive if the stick is left free, but the force required on the stick to maintain trim is not large.

In glides at low speeds, bad tail buffeting and a mild pitching oscillation occur for either flap position. With flaps up the buffeting occurs from about 18 m.p.h. above the stall right down to the stall. With flaps down the buffeting is more violent, but occurs from about 10 m.p.h. to about 4 m.p.h. above the stall only. In the course of ordinary flying the buffeting is only noticeable just before landing.

The flaps reduce the effectiveness of all three controls very slightly. The controls are, however, very effective, and the elevator and ailerons rather too light, with flaps up.

The aircraft is stable laterally right down to the stall, with slots free, but is completely unstable (and uncontrollable) at the stall. With the slots locked shut the lateral stability breaks down at incidences well below the stall, and the stall is vicious.

The maximum level speed of the aircraft at sea level is 170 m.p.h. as received. Removal of some of the excrescences increases this to 172½ m.p.h. The corresponding drag coefficients (less induced drag) are 0.0316 and 0.0306, and the coefficient C_F based on the total exposed surface and higher speed is 0.0072.

THE STRENGTH of FRAMES in MONOCOQUE CONSTRUCTION

By C. GURNEY, B.Sc.*

THE present article deals with the loads which come on to the frames from interaction with the stringers and skin. The subject is divided into two parts, (1) Loads due to shear, and (2) Loads due to bending.

(1) *Loads Due to Shear*

General Theorem with Regard to Curved Beams.

Consider a curved beam loaded normally at every point with a loading of intensity, $w = -\frac{F}{r}$ where F is a constant and r is the radius of curvature.

From Fig. 1 we see that $ds = rd\psi$. Thus $wds = -F\psi d$. We first prove that forces F applied tangentially at the ends keep the beam in equilibrium. (See Fig. 2.)

Projecting forces on to $O_1 O_2$, resultant along $O_1 O_2$ $= F\cos\psi_1 - F\cos\psi_2 + \int_1^2 wds \sin\psi$ (where ψ is the angle the tangent at any point makes with $O_1 O_2$) $= F\cos\psi_1 - F\cos\psi_2 - \int_1^2 F\sin\psi d\psi = F[\cos\psi_1 - \cos\psi_2 + \cos\psi_2 - \cos\psi_1] = O$.

Projecting perpendicular to $O_1 O_2$, resultant $= F\sin\psi_1 - F\sin\psi_2 - \int_1^2 wds\cos\psi = F\sin\psi_1 - F\sin\psi_2 + \int_1^2 F\cos\psi d\psi = F[\sin\psi_1 - \sin\psi_2 + \sin\psi_2 - \sin\psi_1] = O$

To prove moment equilibrium under the applied forces, we make use of the following theorem. Consider Fig. 3. PZ and PZ_1 are consecutive positions of the tangent at P. O is the origin, and perpendiculars OZ and OZ_1 are dropped from O to the tangents. Let angle $ZPZ_1 = d\psi = ZOZ_1$. Let $OZ = p$

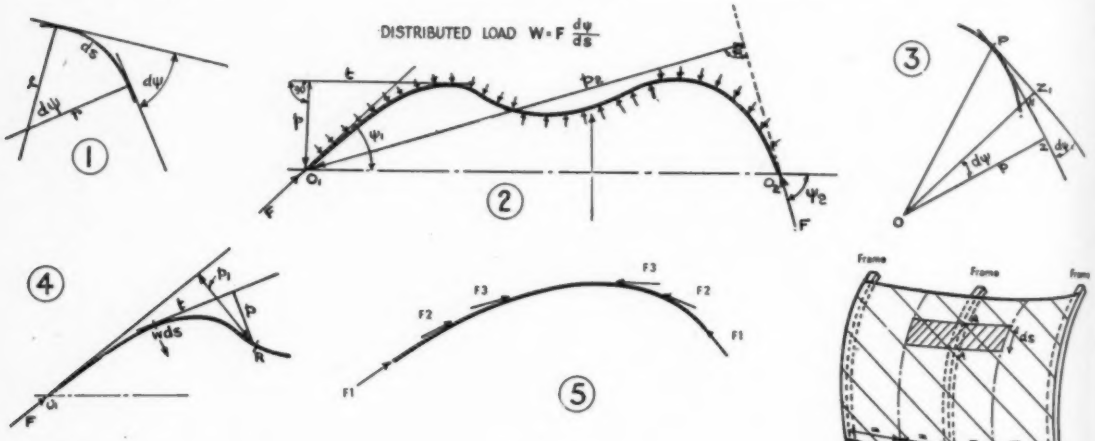
Then in the limit $NZ_1 = dp = PZ_1 d\psi$, *i.e.*, $\frac{dp}{d\psi} = t$ where t is the projection of the radius vector OP on to the tangent at P.

We now apply this to our problem. Take moments about O_1 in Fig. 2. Then $M_{01} = F \times p_2 - \int wds \times$ $= F \times p_2 - \int Fd\psi \frac{dp}{d\psi} = F \times p_2 - F\int_1^2 dp = F \times p_2 - F \times p_2 = O$.

Thus the beam is in equilibrium under the applied forces. Considering the B.M. at a section R (see Fig. 4), and taking origin at R. $M_R = F \times p_1 - \int wds \times t = Fp_1 - F\int_0^1 dp = Fp_1 - Fp_1 = O$.

Thus in a plane curved beam loaded normally at every point with a loading of intensity inversely proportional to the radius of curvature, the B.M. is everywhere zero.

We can extend this to the case where the tangential force F is a variable, providing the normal loading still equals $-\frac{F}{r}$ where F is now variable. This follows since the above system of forces is linear in F. The only equilibrium condition is that the algebraic sum of the tangential forces F should be zero.



By considering one set of forces at a time, and an associated normal loading of $-\frac{Fn}{r}$, $n = 1, 2, 3$ in Fig. 5, we again arrive at the conclusion that the B.M. is everywhere zero.

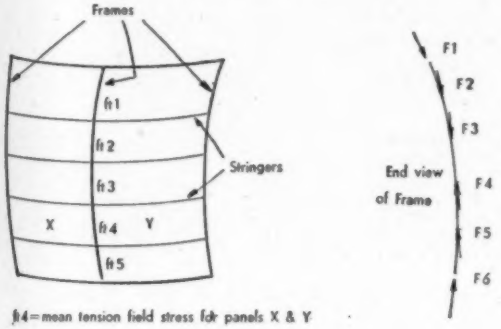
It should be noted that if there are externally applied loads additional to the system considered above, the curvature will be a function of the additional loads, but the B.M. due to the system of forces F and $-\frac{F}{r}$ will still be zero, with the beam in the deflected position. Resolving along the tangent at R (see Fig. 4). End load $= F\cos(\psi_1 - \psi r) + \int_1^r wds \sin(\psi - \psi r) = F[\cos(\psi_1 - \psi r) - \int_1^r \sin(\psi - \psi r)d\psi] = F[\cos(\psi_1 - \psi r) + 1$.

*Mr. Gurney was, before joining the scientific research staff at the R.A.E. Farnborough, on the technical staff of the Bristol Aeroplane Co., Ltd.

$-\cos(\psi_1 - \psi r)] = F$. For a number of tangential loads, end load $= F_1 + F_2 + \ldots Fn$ and shear and B.M. are everywhere zero.

Application of Preceding Theorem to the Frame Problem.

First we consider the monocoque structure divided into panels bounded by consecutive stringers and frames. Then we estimate the buckling stresses of the panels each side of the frame considered, allowing for the stabilising effect of tension due to bend, and we average these fore and aft. Then we estimate the shear stresses in each panel allowing for the effect of body taper, and again average the stresses fore and aft. Then tension field stress $= 2(fs - fscr) = ft$, where $fscr$ is the average buckling stress of a panel in shear, and ft is the tension field stress. This assumes that the principal compressive stress remains constant after buckling, while the tension stress increases.



ft4 = mean tension field stress for panels X & Y

$F1 = \frac{1}{2}(ft1 \times l \times t$ $\quad F2 = \frac{1}{2}(ft2 - ft1) \times l \times t$

$F3 = \frac{1}{2}(ft3 - ft2) \times l \times t$ $\quad F4 = \frac{1}{2}(ft3 - ft4) \times l \times t$

$F5 = \frac{1}{2}(ft4 - ft5) \times l \times t$ $\quad F6 = \frac{1}{2}(ft5) \times l \times t$

(7)

Divide the frame into a number of equal elements of lengths (ds). The stringer spacing is suitable. Assuming the number of stringers to be large, the length A-A will be loaded by curvature effects of the area with double shading in Fig. 6.

The total tension force on this strip in the direction of the frame is given by $\frac{ft}{\sqrt{2}} \times t \times \frac{l}{\sqrt{2}} = \frac{ft}{2} \times l \times t$ where t is the skin thickness. The force normal to the frame due to this tension is $\frac{ft}{2} \times l \times t \times \frac{ds}{R_T}$ where R_T is the transverse radius of curvature of the frame. The end load in the frame due to the tension field $= \frac{ft}{2} \times l \times t = (fs - fscr)l \times t$ which in general is a variable since fs and/or $fscr$ varies, and we have a tangential force applied at each stringer (see Fig. 7).

If the tangential forces are given by F, the normal forces are given by $-\frac{Fds}{r}$ and we have a system similar to that previously considered, the only B.M. being due to the fact that the neutral axis of the frame is inboard of the skin (see later).

Similarly, the normal force due to the longitudinal curvature is given by $\frac{ft}{2} \times l \times t \times \frac{ds}{R_L}$ where R_L = longitudinal radius of curvature. The compression in the stringer due to tension fields is $\frac{ft}{2} \times ds \times t$ and the outward normal force due to this is $\frac{ft}{2} \times ds \times t \times \frac{l}{R_L}$ This exactly balances the inward normal force from the skin. Let h be the distance from the skin to the neutral axis of the frame. Then at the point of application of each tangential force F we have an offset moment $F \times h$.

We can now do a strain energy calculation on the frame to include the effect of continuity, remembering that the B.M. is only due to the applied couple $F \times h$ (see Fig. 8).

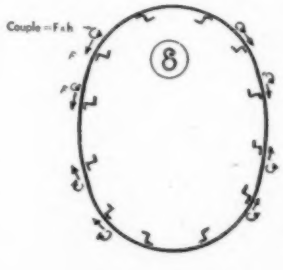
Complete Rings

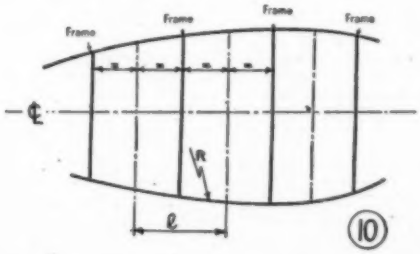
It should be noted that the method of applying tangential forces to the frames is only strictly correct, for a monocoque section open top and bottom. Where the monocoque section is a complete ring instead of having tangential forces, it is possible for the tension in the skin, parallel to the frames, to continue over the top and bottom, and to be reacted by tension from the other side. This would necessarily be the case if the frames were not riveted to the skin. In this case there is no bend in the frames due to $F \times h$, only uniform end load equal to F. The tension in the skin parallel to the frames is now constant and equal to one-half the greatest value of ft, while the shear along and perpendicular to the body axis, and the tension along the body axis, vary to accommodate changes in shear over the section.

The difference in stresses computed on this basis and on the basis of applying tangential forces will be (assuming fixing in the latter case) about 25 per cent. Since the design stress on any particular type of frame is best found from a test on a portion of a typical monocoque, analysis of the test by either of the above methods can be made, and providing the same method is adhered to in application to fuselage design, no error will result.

In the case of torsion, since the shear per inch run is constant round the section, and providing the thickness of the skin and spacing of the stringers is approx. constant and varying stability due to variation of curvature is small, the tension field stress will be constant; and so will the tension stress parallel to the frames. In this case there will definitely be no bending due to $F \times h$, and the frames are under uniform compression F.given by $F = \frac{Q - Q_1}{2A} \times l$ where Q = torque, A = area of enclosed section, l = frame spacing, and Q_1 = buckling torque.

If the tension field stress is high and the stringers are flexible, a line drawn on the skin, parallel to the folds, and terminated by consecutive frames will lose its curvature and become straight. We now have a break in the direction of such a line, at the frames; but the inward





component of the force from the tension fields is the same as if the curvature had not altered. This follows since for approximately circular arcs tangents at the mid points of the arcs are parallel to the respective chords.

(2) *Loads Due to Bending*

(*a*) *Loads Due to Curvature Produced by Bending.*

Consider a monocoque section shown in Fig. 9. The direct stress is given by $f = \frac{My}{I}$ and the load in any stringer by $P = \frac{My}{I} \times As$ where As is the stringer area. The curvature of any section due to bend is given by $\frac{E}{R} = \frac{M}{I}$.

Thus the compressive loads in a frame due to bending are given by $w = P \times \frac{M}{EI} \times l$ where l = frame spacing.

These forces act parallel to the plane of the B.M. and in the plane of the frames. They are small, but become of importance in such cases as side bending on small fuselages with large holes for cockpits.

(*b*) *Loads Due to Curvature of Fuselage Lines.* (*See Fig.* 10.)

If sections containing the axis of the body are curved appreciably we get loads normal to the frames due to the end loads in the skin and stringers. The magnitude of these normal loads is given by $w_1 = P \times \frac{l}{R}$ where R is the radius of curvature of a section of the fuselage containing the axis, and P is the load in a stringer or cross-sectional element of the skin. These forces are inward on the tension side, and outward on the compression side, for positive curvature. It should be noted that if the sizes of adjacent frames are comparable, the frames will deflect approximately equal amounts and will not alter the curvature.

We are now in a position to calculate all the loads coming on to the frames from interaction with the stringers and skin, and end loads and B.M.s can be obtained from a strain energy calculation.

The stability of the skin-stringer-frame combination needs a separate calculation, and this can be checked for by the method of R. & M. 1679.

VICELESS SPEED

Martlesham and the Percival Mew Gull

"MARTLESHAM is pleased with it" has long been the expression used by aircraft constructors when they want to impress anyone with the excellence of their latest products. Rarely is one permitted to read the report in which Martlesham expresses its opinions of a new aeroplane; consequently, when Capt. E. W. Percival offered *Flight* the opportunity to see Martlesham's report on the first of the Mew Gulls to be fitted with Gipsy Six Series II engine and v.p. airscrew, the offer was gratefully received, the only stipulation being that any criticism which the report might contain should be open to quotation as freely as any points of praise.

Trials were made of the machine with three loadings, the c.g. being 20.7in., 17in., and 15.4in. aft the leading edge. The weight with the c.g. farthest aft was 2,133lb. At this weight and with this c.g. position, the report states, the controls were well harmonised, light, quick in response and effective. The tail trimming gear was very effective, the engine controls well situated, the flap gear well placed and easy to operate and causing little change of trim. Laterally and directionally the machine was stable under all conditions of flight, whether with engine "on" or "off." With the c.g. in the rearmost position, the machine was longitudinally unstable, but as fuel from the rear tank was consumed, the c.g. moved forward and the instability disappeared.

And now for performance. Climbing, with the airscrew in fine pitch, a height of 4,000ft. was reached in three minutes at an I.A.S. of 100 m.p.h. The take-off run against a wind of 5.5 m.p.h. was 300 yards and the landing run, using the brakes, following an approach with flaps down, was 276 yards. At full load the machine stalled at 84 m.p.h. with flaps closed and at 73 m.p.h. with flaps down.

With c.g. in the forward position the machine rocked slightly before stalling, but the stall was gentle and straight, both with flaps closed and with flaps down. With the c.g. in the rearmost position, both with flaps open and closed, there was a marked "shuddering" before the stall; following this, the starboard wing dropped about 20 deg. suddenly. The wing could be raised by the use of the ailerons, but if the machine was left alone the wing would come up unassisted, or the nose of the machine would drop. With all c.g. positions right-hand and left-hand gliding turns could be made satisfactorily, flaps up and flaps down, at 1.2 times the stalling speed. The machine would sideslip satisfactorily, the limit apparently being 20 deg., when the report states the nose fell away.

The diving trials disclosed that the Mew Gull is unstable longitudinally (i.e., in pitch) when diving, all controls becoming slightly less sensitive and heavier. Small movements of the controls, however, give proper response without causing control surface instability or vibration. Recovery from the dive is easily effected. The diving trials, by the way, were with c.g. in rearmost position and the limiting conditions were an I.A.S. of 246 m.p.h. and 2,400 r.p.m., whichever occurred first.

So now we know the worst and those who had, secretly or openly, regarded the Mew Gull as something of a racing freak will have to think again. Considering the high wing loading (25lb./sq. ft) and short span, the stability and the low stalling speed must be regarded as rather remarkable. It is also worth noting that the controls are effective throughout.

Aluminium Alloys

A PAMPHLET containing a list of selected aluminium alloys has been issued by the Aluminium Union, Ltd. Tables of mechanical, chemical and physical properties of each of the alloys are included and there are notes on uses and foundry properties. The brochure may be obtained from the Union at Bush House, London, W.C.2.

A New Control Bearing

A RECENTLY issued Hoffmann list contains particulars of a new series of ball bearings for aircraft controls. Known as the "C.A." type, and approved by the Air Ministry, the bearings have grease-retaining end shields and a self-aligning movement. Copies of the list are obtainable from the Hoffmann Manufacturing Co., Ltd., Chelmsford, Essex.

Synthetic Rubber

Synthetic Rubber, by W. J. S. Naunton. Macmillan, 7s. 6d.

IN this, said to be the first book on synthetic rubber to be published since 1926, Dr. Naunton deals with both the technical and economic aspects. He speaks with authority (as head of the rubber laboratories of Imperial Chemical Industries, Ltd., and hon. technical adviser to the Institution of the Rubber Industry) on the technical advances and changes of outlook and policy which in the last ten years have made the large-scale production of synthetic rubber practicable and economically desirable.

Having discussed the chemistry of synthetic rubbers and dwelt on the division between rubbers and resins, Dr. Naunton reaches the main conclusion that there is a great field for development of a product which can give better service than natural rubber, though more expensive.

FOR THE ATLANTIC

Successful Test Flights of the First D.H.91 Albatross : The Scene at Hatfield

IT is not often that one has the chance of being present to watch the very first flight of a new machine, and certainly not of one as interesting as the new D.H.91. In fact, of course, even at the comparatively early hour of seven o'clock, there was a very fair crowd of people on the tarmac outside the paint shop awaiting the great event. Nearly all those who had been directly or indirectly concerned with the design and construction of the machine were there, as well as Mr. Ivor McClure to represent the Air Ministry, by whom the first two 91s have been ordered for experimental flights across the North Atlantic. Later on the entire works were let " out of school " to see it fly.

During the past few weeks a good deal of ground testing has been done, and it was thought that after so many hours of high-speed taxying it might be necessary to change the Gipsy Twelves. When Mr. R. G. Waight, the D.H. chief test pilot, took the first Albatross straight off the ground at about 6.55 a.m. on Thursday of last week, three of the original engines were still in their mountings. For this and for several other obvious reasons connected with a preliminary test, the engines were never given much more than half-throttle either during the initial try-out or during the other flight made later in the morning. Even so, with a light load the take-off was quite fair, though it was quite obvious, both from the length of the " almost unstuck " section of the run and from the consequent climb, that the motors were being nursed. At half-throttle the machine was extremely quiet, so it may be imagined that in the same conditions and in coarse pitch at cruising altitude there will be nothing to complain about.

Even with the undercarriage down the Albatross is an extremely pretty machine in the air, and when Mr. Waight accompanied as before by Mr. G. D. Tucker, a junior test pilot, flew past at low altitude with the undercarriage retracted, one obtained a very real idea of its clean lines. Actually, the undercarriage was not quite home during this passage, since, apparently, there was some slight maladjustment in the indicator system. On sight, at any rate, it would be difficult to imagine a four-engined machine with a smaller frontal area, and gives one reason to hope that even the suggested 200 m.p.h. cruising speed may be found to be on the pessimistic side. We are not yet accustomed either to the sight of real spinners over v.p. or c.s. airscrews.

Oceanic crossings are in the news but, Atlantic or no Atlantic, the passenger-carrying versions of the Albatross are likely to be equally interesting and to provide something exceptional in the way of comfortable performance over medium distances.

Watched by the majority of the D.H. employees, the Albatross is taxied in by Mr. Waight after its third test flight. Some idea of its exceptionally clean lines may be gathered from the flying picture above. (*Flight* photographs.)

7.15 a.m. : Discussions after the very first flight. In the main group, from left to right, are Mr. R. G. Waight (pilot), Mr. A. E. Hagg (designer), Mr. F. E. N. St. Barbe (business manager), Major F. B. Halford (engines)—the last two almost out of sight behind Mr. G. de Havilland, Junr.—and Capt. Geoffrey de Havilland. Standing modestly to the left is Mr. G. D. Tucker, who assisted Mr. Waight during the preliminary trials.

Topics of the Day

Imaginary Effects

EVERY now and then the old business of wind effect crops up again in some argument between flying people. Feeling certain of the course of logical reasoning, I have always claimed that any aircraft, once loose from the ground, can be treated as moving in an absolutely stationary medium, and have listened with growing suspicion to any statement, for instance, that down-wind turns are dangerous.

The gliding people are insistent about that last fact, and claim that pilots always find that, whereas a turn made into wind can be made carelessly and may, in fact, provide one with reserve speed, turns down-wind must always be made with care and an adequate supply of speed. As it stands, that is pure mediæval nonsense, in my opinion, though I take their word for it that pilots *do* find such difficulties.

A few days ago I had a long argument with somebody who found it extremely difficult to dissociate his ideas of ground and air speed. The immediate result of my endeavours to clarify the situation for him was that it was cleared for me as well, and I am now a Philistine again. You and your aeroplane or glider can move about as satisfactorily in a hundred-mile-an-hour wind as you can in a flat calm—so long as the wind speed remains constant.

One might imagine a racing car on a steeply banked track, the latter being moved bodily at a constant speed; the drivers would not notice the slightest difference unless they happened to see the rest of the landscape as it went by. Probably the best simile to use is that of an express train, in which the train is equivalent to the wind mass and the grip of one's feet on the corridor floor to the grip of the wings on the air. So long as the train's movement, fast or slow, is steady, one can run in each direction or turn circles with equal ease and even play cricket in the corridor without making any allowances. Hang it all, the earth itself and the solar system are hurtling through space at some incredible velocity, but this does not make the slightest difference to our movements.

To the gliding people I say: Go up above the clouds on a day of really high wind, and I defy you to tell me, without reference to the compass, whether you are turning up-wind or down-wind. The effect, in so far as it is real, may be the result of changing air currents near the ground—affecting the lift in different ways according to the attitude of the machine.

Psychological

BUT the great worker of all such apparent magic is nothing more or less than applied psychology, and the effects are so much more noticeable to the glider pilot because his air speed is so comparatively low. After moving over the ground at a mere 10 m.p.h., it is somewhat disconcerting to find oneself suddenly moving at 50 m.p.h.—quite apart from the strange sensations obtained during the turn itself. The impression of extra lift after a turn in the other direction is the equally natural result of the sudden change in ground speed.

If the gain or loss of height is very real on occasion, it is surely the result of the instinctive application of various incorrect conclusions to the actual control of the machine, either during or after the turn itself. Somebody else can work that idea out thoroughly. It is certainly a fact that some pupils will never learn to do correct gliding turns near the ground though they may be able to do them very well indeed at a safe height. The swift movement over and the proximity of the ground upsets them, and their turns are flat to the point of being actively dangerous. Hence the amount of spinning-in off gliding turns which is still done year after year.

There is another point, too, and that is that the wind velocity near the ground is very much lower than it is higher up, and a down-wind gliding turn made into a lower-speed layer naturally causes a sudden drop in air speed.

Wind Changes

AS far as that is concerned it might appear that I have left a large loophole in the argument. Whereas no movements of an aircraft in a constantly moving mass of air can have any possible effects other than those which are actually made by the controls, a sudden change in wind velocity is quite a different matter. In that case the machine must either accelerate or decelerate instantaneously if its speed through the air is to remain constant.

The undoubted fact that a flat calm hold-off is very much more prolonged than one carried out into a fair breeze has always struck me as being "agin nature." The only reasonable reason which I can produce is that the wind speed at ground level is quite a lot lower than it is, say, at 10 feet. If the machine is brought in at an air speed of 60 m.p.h. against a 20 m.p.h wind, and this wind drops to 10 m.p.h., then the machine's air speed is only 50 m.p.h. In any case, the additional roughness of the air near the ground on a windy day would account for quite a rapid loss of speed.

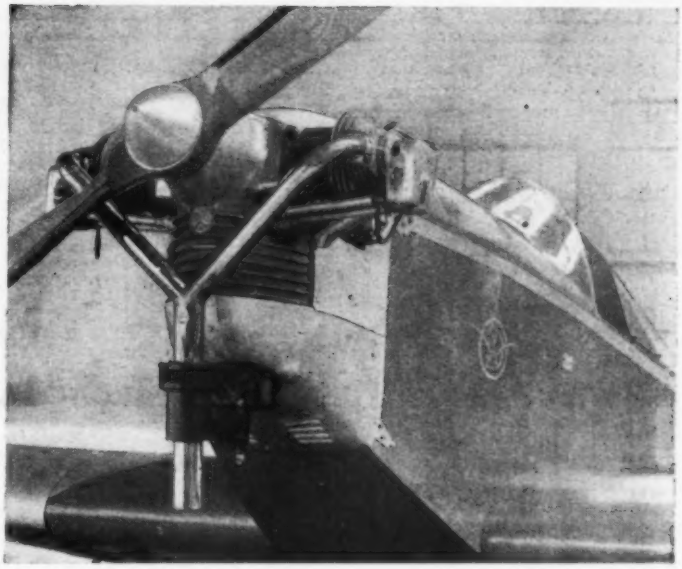
Most of us know of aerodromes where, when the wind is in a certain direction, the approach must be made quite fast if control is to be retained for a reasonably accurate hold-off. When approaching over hangars, for instance, the air may be "piled up" on the windward side so that one drops into almost still air once they have been crossed. An aerodrome with a pronounced camber may have a dead air region near the boundary on the leeward side, since the wind will not necessarily follow the contour of the ground.

INDICATOR.

PRACTICAL FELINITY

Flying a More Powerful Version of the Dart Kitten : Useful Performance

SOME time ago (in the issue of February 18, to be exact) the prototype Dart Kitten was described and its handling qualities remarked upon. Rightly or wrongly I felt then that the Kitten would be improved if there was another 10 h.p. or so to draw upon—particularly for the take-off and climb. The word "underpowered" has no real meaning except in relation to wing and power loadings, and as a flying machine the Kitten performed admirably. It was merely my opinion that a little more power would be a good thing, since I felt rather that the machine, otherwise excellent, appeared to fall between two stools in the ultra-light market. Thoroughly strong, sound and easy to fly, the 27 h.p. Kitten, I felt, could not safely be used for small-field flying, and yet was not quite fast enough to be useful for aerodrome-to-aerodrome travels.



The new engine has been very neatly installed in the Kitten as this *Flight* photograph of its nose shows

Half-an-hour's flying in the new Aeronca-J.A.P.-engined version has, if anything, hardened that impression, though I was unjust enough to refuse an invitation to go up again in Kitten I. Perhaps I felt that I might be forced to recant. Even with an airscrew which did not permit the engine to give its maximum revolutions, the take-off was as short, even in an almost flat calm, as anyone could wish, the climb was of the 700-a-minute order, and the maximum speed appeared to be a little short of 90 m.p.h. The Kitten, because it is extremely strong, is quite heavy for its type, and it felt as if the power was just right for safe and useful operations over the countryside. Allowing for an average wind speed over the year of 15-20 m.p.h., a cruising speed of something in the region of 80 m.p.h. means that a machine can get about. Though not quite as smooth as the Ava engine, which is a flat-four two-stroke, the J.A.P. can only be felt at full throttle and at certain small openings when the mixture is distinctly "off."

This latest version incorporates some modifications which are the result of extended experience with the prototype. The screen, for instance, has been extended rearwards, so that it is now quite unnecessary to wear goggles, and the little rear locker can be reached from the outside. The spring-loaded trimming lever, too, is now on the left and not at the base of the stick, and larger wheels are fitted to the cantilever undercarriage legs. When I flew this new machine the undercarriage was distinctly stiff, a fact which made ground travel somewhat uncomfortable. The only other criticism which I have to make concerns one of the controls and is a point which can very easily be modified. All the controls are, in fact, pleasant and powerful. The rudder, however, which one seldom uses, gives one the impression of being slightly overbalanced and the effect is exaggerated by the method of operation, which is "one way" only, springs being used to hold the control cables in tension. Stronger springs and a little less balanced area for the rudder would probably make all the difference.

When I flew the machine the A.S.I. was giving some very doubtful indications at the lower end of the scale and I brought the Kitten in at a speed which felt right, there being plenty of control, though by aural indications alone one would have said that the glide was being made too slowly. Even so, the hold-off was considerably prolonged. The Kitten's stall is almost completely innocuous and it would be quite safe to bring it into a small aerodrome at a speed only a few m.p.h. above that at which the pre-stall sink becomes evident. For such an approach, however, accurate indications are essential. It seems that we shall eventually see the pitot heads of all slow-landing machines mounted on a five-foot extension above and ahead of the leading edge!

H. A. T.

FROM the CLUBS and SCHOOLS

LONDON

THE flying time at Hatfield during last week was 123 hr. 15 min. Messrs. B. Cartwright, P. M. B. Lucas and R. I. Hallows made their first solos and Mr. D. G. Hutton completed the tests for his "A" licence. New members are Messrs. C. R. G. Grant and H. D. Raynham.

YORKSHIRE

Flying on Yorkshire Aeroplane Club machines for last week totalled 63 hr. 30 min. The weather was good at Whitsun and a good deal of joyriding was done at Yeadon, the joyriders themselves being drawn from the ranks of the spectators. The aerodrome will be open to the public on May 29, Empire Air Day. On the following day the film "R.A.F." will be shown to members.

WITNEY AND OXFORD

Flying hours for the week ended May 22 totalled twenty at Witney. Messrs. R. G. Secretan and P. W. M. Mallorie have passed their "A" tests. First solos were made by Messrs. E. D. Nicol, B. T. O'Reilly, and J. E. Mansfield. Mr. G. R. Beale-Browne, who has an "A," is now working for his "B." Club machines visited Cardiff for the Coronation Rally on May 15, and one was fortunate enough to win third prize, value £25, in the arrival competition.

DONCASTER

The Doncaster Aero Club machines put in a total of 27 hr. 35 min. for fortnight ended May 19. One first solo was made by Mr. W. Pyrah.

NORTHAMPTONSHIRE

Flying hours at Sywell are steadily increasing with the longer flying days. New members include the Hon. A. Verney Cave, Mrs. L. Wood, Mrs. Paterson and Mr. D. B. La Hive, who have joined as flying members. Miss Bridget Benson has passed her "A" tests. The aerodrome will be open to the public on Empire Air Day and it is expected a number of Service machines will be on view.

HAMPSHIRE

Three Club Moths flew to Cardiff on May 15, to compete in the arrival competition. None were fortunate, but Mr. C. R. Curtis Nuthall won the competition at Portsmouth on May 19. Mr. R. J. Rerrie qualified for his "A" licence and Mr. J. A. Duff has made has first solo. An old-timer returned to flying is Capt. F. Warren Merriam, A.F.C., who recently made his "first" solo in a Club Moth. It may be recalled that he taught many famous people to fly at Brooklands from 1911 onwards. On May 20 the Leopard was busy all day taking people over and round the Fleet.

Private Flying

YORK AND LEEMING

During week ending May 22 the York and Leeming Club flew a total of 162 hr. 20 min. New flying members are Messrs. Chichester and Smith, and old pupils to return to the fold are Dr. Eckersley, and Messrs. Jaggar and Greenwood.

YAPTON

Times for the week ended May 22 totalled 33 hours at Yapton, despite two completely blank days of high wind. New members are: Flt. Lt. D. Michell and Messrs. T. Farnsworth, B. Arden and David Block; the last two are taking the £15 "A" course.

HANWORTH

A large number of overseas visitors have been flying at the London Air Park Club recently, and last Friday a party of two hundred Canadian schoolboys descended on the Club for the afternoon. The flying time last week totalled 106 hr. 20 min. Miss F. L. Planel made a first solo and Mr. Roberts joined the Club.

PERTH

Miss Margaret Cunnison, who learnt to fly at Renfrew some four years ago and who later obtained her "B" licence at Lympne, has been appointed instructor to the Strathtay Aero Club, Scone. She will succeed Mr. J. S. O. Myles, who has been with the club since its formation last July and who is returning to Airwork proper.

BORDER

A weather-change for the worse during last week reduced the hours somewhat, although several of the more experienced members put in some bad weather flying practice. Visitors by air are becoming increasingly numerous, and it is fortunate that the large new hangar is nearing completion. The Club's financial year ends on May 30, and only one new member, Mr. H. S. Hays, has joined the Club. Several others have announced their intention of joining in June.

BOMBAY

The Bombay Flying Club put in 330 flying hours during April. Messrs. D. A. Samant and K. B. Commissariat obtained their "A" licences and Mr. W. G. Robinson renewed his. Instructional night flying was carried out from April 8 to 11 and from 16 to 19, when seventeen hours were put in. Fourteen hours' instrument flying was also carried out. Four machines, piloted by Messrs. D. A. Samant, C. B. Rodgers, P. D. Byramjee and M. D. Mistry, under the supervision of Flt. Lt. J. A. Simpson, will leave Bombay on May 29 and arrive at Heston on June 12. Whilst in England the four pilots will take their "B" licence tests.

BROOKLANDS

Last week the flying time for the Brooklands Club totalled 130 hours. Mr. Pepper made his first solo, "A" tests were passed by Mr. Willoughby, and Capt. Hanmer and Mr. Carpendale joined the Club. By way of record-breaking Messrs. Orton and Hunt, in the latter's Puss Moth, made a trip to Copenhagen and back in a day. They went via Hamburg and took fifteen hours for the trip. The first Southern Dawn Patrol of the season was held at Shoreham last Sunday, with the South Coast Club as defenders. Sixty-two machines took part, and of these the nine defending machines caught fifty-five. The total number of machines present was seventy-one, this being five more than last year's "record." A Gloster Gladiator will give an aerobatic display in the early afternoon of Empire Air Day at Brooklands.

JOHANNESBURG

At the tenth ordinary general meeting of the Johannesburg Light Plane Club the chairman, Mr. G. Mackenzie, stated in his address that the membership of the Club, under all categories, stood at 612, as against 609 for the previous year. Under the direction of the school, he said, flying activities had increased considerably, 49 members having obtained their "A" licences, as against 28 for the previous year, and seven members their "B" licences, compared with five for 1935. He went on to say that under the new Government Training Scheme the Club had been allotted 87 pupils over a period of three years, and that university students were to receive 110 hours' flying spread over a period of one year and nine months, and non-university students 215 hours' flying spread over a period of three years and three months. In conclusion he said that the Club's fleet consisted of ten machines, four of which had been purchased during the year.

NORFOLK AND NORWICH

Despite cold weather nearly forty hours were recorded by pupils and pilots during Whitsun. The Club sent two machines to Raynham Hall for the coming-of-age party of the Marquis of Townshend and a message was dropped. Additional entries for the Public Schools Aviation Camp have been received from Malvern College, King Edward VII Hospital, Windsor and Wrekin College.

During last week a total of forty-five hours' flying was logged and Miss Saunderson started instruction. Messrs. O'Maera Trevethic and L. Fawcett passed their final "A" examination. The club has vacancies for two pupils to be trained under the deferred payment scheme. To-day Mr. Clifford White is bringing a party of members of the Young Liberal's Association to tea and a demonstration of aerobatics in flight formation will be carried out by Number I Fighter Squadron, R.A.F. station, Tangmere.

CAMBRIDGE

The flying times at Marshalls' School for the week ended May 22 totalled 120 hr. 45 min. Three new members joined and Messrs. Pringle and Rigg completed the tests for their "A" licences. Cross-countries were flown to Portsmouth to see the Fleet and also to Gatwick and Nottingham. Three Moths went to Gravesend on Sunday to co-operate with the C.A.S.C.

C. A. S. C.

Last Sunday the Corps held their Coronation display and inter-squadron competitions at Gravesend. Messrs. R. T. Dew and W. Bellew were first and second in the general landing competition; Messrs. W. Bellew and F. J. McMurray led in the inter-squadron landing contest; Messrs. S. A. Dew and I. R. Mascall were first and second in the cross-country race; Mr. K. Gabb won the bomb-dropping competition; and the leaders in the general flying competition were Messrs. H. T. McMurray and S. Smith.

SOUTH COAST

Forty-two hours were flown during last week and first solos were made by Messrs. Foord and Legge. A successful "Eve of the Battle Ball" was held on Saturday night previous to the Dawn Patrol on Sunday, 120 members and their friends dancing at the club till past midnight. The Dawn Patrol on Sunday morning, nine Shoreham machines defending, succeeded in stopping all but seven of sixty-two attacking aircraft. A total of seventy-one machines parked on the aerodrome during breakfast was a remarkable sight.

EDINBURGH

During the week ended May 16 a total of 30 hr. 35 min. flying was carried out at Macmerry. New pupils are Messrs. C. W. Morrison, W. D. Annan, and G. W. B. Fullerton. One of the Club machines was used and flown by two members—Mr. Chalmers Watson and Mr. I. D. Shields—for the purpose of transporting newspaper pictures on Coronation Day between Glasgow and Edinburgh in each direction. Films were taken in the Club Moth flown by the chief instructor, Capt. S. F. Woods, to Perth, Dundee and Aberdeen on the 13th.

SOUTHEND

The flying times for last week exceeded all figures for this month. Owing to the visit of the Senior Service, followed by Whit-Monday Bank Holiday, machines were flying to capacity. It has been necessary to engage Mr. Lynton Blow as assistant instructor. On Sunday members turned out in full force for the Dawn Patrol at Shoreham. The Short Scion, two Cadets and Gipsy 1 Moth took part. Competitions will be held during Empire Air Day, and the R.A.F. at Hornchurch are sending machines over. A dance will be held at 7.30 p.m. in the clubhouse.

PORTSMOUTH

The total hours flown by members of the Portsmouth Aero Club during the week before last amounted to nearly forty-two. A landing competition was held on Sunday, May 16, and Mr. T. B. Birkett was the winner, the runners-up being Mr. A. P. C. McKee and Dr. F. G. Mundell. The Club proposes to hold a landing competition every quarter. Mr. F. Madon made his first solo, and Mrs. F. I. Morison qualified for her "A." New members are: Messrs. W. F. Gunn, R. W. Duckett, H. Heywood-Jones, H. V. Horner, A. Maurice Booker, and E. H. Alliott, and Mrs. P. Horner, Mrs. F. I. Morison, and Miss J. P. Parsons.

The York International

TWENTY-FOUR pilots from abroad and thirty-two from this country have signified their intention of attending the International Meeting at York, which will be held on June 4, 5 and 6. The latest acceptances include nine machines from the German Aero Club.

All visiting pilots should bring their own cockpit covers and screw pickets since hangar accommodation will obviously not be available for such a large number of machines. An all-night guard will be kept over the machines. English pilots should, as far as possible, also apply for their necessary tickets in good time. Arrangements have been made for the visiting pilots to clear Customs at Heston.

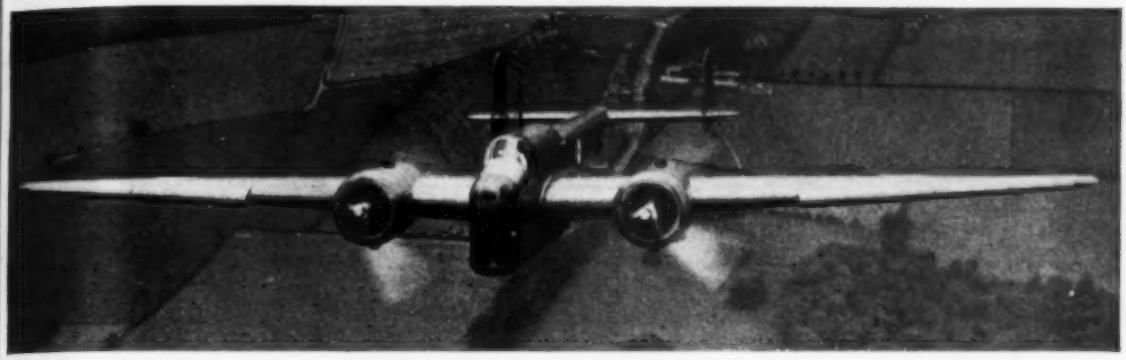
Magyar Picnic

ONCE again the A.A. and R.Ae.C. are collaborating in the organisation, from this end, of the Magyar Pilota Picnic, which has become a classic affair since Hungarian hospitality was so much appreciated by the entrants of the earlier events.

This year the meeting opens on Tuesday, June 15, at Siófok aerodrome on Lake Balaton, and, in commemoration of the tenth anniversary of the meeting, a sealed time arrival competition will be held between 10 a.m. and midday (B.S.T.). Thereafter the Picnic consists very largely of surface excursions into the country and into Budapest—a good thing, since Hungary is designed to be looked at and the outward trip provides flying enough. Bathing costumes rather than evening dress should be taken.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.



VISIBLE PITCH: Careful study of this *Flight* photograph of a Handley Page Hampden will reveal spirals of vapour trailing from the airscrew tips—a phenomenon that would appear to have a bearing on the subject of Mr. Gordon-Marshall's letter below. The photograph is untouched.

ABERDONIAN SKY-WRITING

IN your account of the R.Ae.S. Garden Party, which was held at Heathrow Aerodrome on May 9, you mentioned an aftermath display given by the pilot of a Miles Sparrowhawk, during which your observer noticed "the appearance of white plumes of smoke, water, or fuel from the wing-tips at certain critical moments."

I happened to discuss this with a knowledgeable American friend, and he said that he had seen a similar effect on several occasions, particularly at the Cleveland and Los Angeles Air Races. It is dubbed "drawing air," and is a natural phenomenon which usually occurs when an aeroplane is pulled out sharply from a fast dive, or is yanked round a pylon at high speed at a fairly acute angle. The effect would seem to be peculiar to certain types of aircraft, but it invariably takes the form of almost rope-like white spirals trailing from the wing-tips of the machine. Apparently weather conditions are not wholly responsible, as my friend had seen it on clear, dry days, whereas it was wet and humid at Heathrow.

It would be interesting to have a technical explanation of the cause, or to know the combination of circumstances necessary to produce this economical sky-writing substitute.

Heston. P. E. GORDON-MARSHALL.

[A rather similar phenomenon at airscrew tips is a fairly common occurrence, and, as will be seen above, *Flight's* photographer has caught a Handley Page Hampden in the act.—ED.]

AUTOGIRATION

AS a thoroughly bad but tremendously keen Autogiro pilot, I have read with considerable interest "Indicator's" experiences in Autogiration.

One point on which I feel emphasis should be placed is the landing of these machines. They must be landed directly into the wind. My worthy instructor and friend, Mr. Marsh, used to remark that, even on days without any signs of wind whatsoever I was to land dead into it!

Flying as a passenger in normal aeroplanes I have often noticed particularly how many pilots, preparing to land, give one careless glance at an indicator, or perhaps at some smoke somewhere in the neighbourhood of the aerodrome, or perhaps not at all, then casually land parallel to one of the boundaries so that they stop rolling in front of the club-house. I realise perfectly well that this type of landing can be made intentionally and in perfect safety, but I feel equally sure that many pilots, when some ten or so feet off the ground, suddenly notice that the ground appears to be sliding away sideways very rapidly, and thereupon allow the undercarriage to "take it."

All such offenders should be advised strongly to take an hour or so of dual on the very excellent and much-maligned Autogiro. Perhaps they would then treat the undercarriages of other people's aeroplanes with more respect.

I end this letter wondering how many planes are "piled-up" through this procedure.

J. T. BENT.

Harrow-on-the-Hill.

MANNING MR. MANNING'S AIRSHIPS

MR. W. O. MANNING'S article, "Blimp Redivivus," makes me think what an opportunity his airship scheme would offer for an R.A.F. reserve force. I am twenty-seven years of age, have an "A" licence, and am medically fit, but am turned down by the R.A.F. Volunteer Reserve as I am over twenty-five years of age. One reason I have heard given for this age limit is that the R.A.F. only want dare-devils to fly their over-250 m.p.h. 'planes. Men over twenty-five years of age are likely to be more cautious.

As a "blimp" has a very low speed, and is not expected to take part in aerobatic stunts, older men would be ideal for this type of work, where great patience is needed on convoy patrols and weary hours spent over the sea. I am sure many men would be anxious to join such a reserve if the R.A.F. raised the age limit to thirty years. If war broke out the R.A.F. would haul us "A" pilots in without troubling whether we were over twenty-five, so why not give us the chance to train now? One volunteer is worth twelve press-ganged men.

J. E. LUSH.

London, N. 15.

BOTH ENDS OF THE BEAM

I AM very much afraid that your correspondent "McCockney," like many people who write to papers criticising articles, did not read my article, "Links in the Air Defence Chain," as carefully as he should have done.

If he did not immediately tear it to pieces on reading it he would find that instead of suggesting a scheme by which day-dreaming heroes who conceive themselves as the air aces of the next war should be permanently placed at the wrong end of "some old searchlights," I actually recommended that surplus recruits "waiting to begin technical courses in the R.A.F." should be trained as searchlight operators. Alternatively, I proposed that young men who were sufficiently keen on joining the R.A.F. might take advantage of a preference obtained by first joining the searchlight section. "McCockney" evidently does not know that there have been long waiting lists for practically all sections of the R.A.F., and the application of a scheme such as the one I put forward would give the most enthusiastic air-aspirants their chance to obtain some preference. To the best type this would be better than blunt rejection.

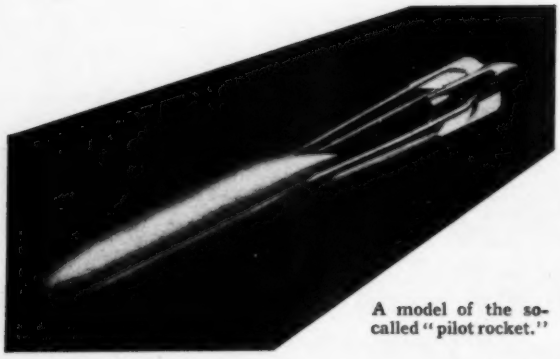
"McCockney" can be excused for not knowing that, like *Flight*, I have been carrying on a campaign (in the *Sunday Times*) for the transfer of the A.A., lock, stock and barrel, to the R.A.F. On the other hand he should have noticed that, in the article with which he quarrels, I said, "the major responsibilities in active defence will rest on the Air Force which, if not now, must ultimately accept the entire responsibility for air defence, including anti-aircraft guns." This may not have appeared strong enough to suit "McCockney," who evidently had not been sufficiently interested in the subject to read Sir Thomas Inskip's and Mr. Duff Cooper's speeches during the

(*Concluded on p.* 539.)

ROCKETEERING

Or the Hunting of a Canard

By WILLY LEY



A model of the so-called "pilot rocket."

SOMETIMES I wonder whether it will continue all through my life, this battle with the annual rocket hoax. It appears frequently in the ocean of printed paper that is issued every day in every country of the globe, and it is apparently no easier to kill than the notorious sea serpent.

It is well known that the modern interest in rockets and their possibilities began just after the world war, when Professor Robert H. Goddard, in America, and Professor Hermann Oberth, in Germany, published their first treatises. I was in Germany then, and shortly after the publication of Oberth's book (which was printed for the first time in 1923) the first hoax was perpetrated. Someone sold us the idea that Professor Goddard had actually reached altitudes of a hundred miles with his rockets. Of course, it was not true. It did not even become true in the meantime, the four kilometres reached by one of the "repulsors" of the German Rocket Society is still the limit.

We started the German Rocket Society (Verein für Raumschiffahrt) in 1927. In the beginning it was simply a society of interested scientists and laymen who discussed rocket problems in meetings, papers and by correspondence. Experimental work was not begun earlier than 1929. Meanwhile, similar societies had been founded in Austria, Soviet Russia, and in France. In short, there was much activity but no rocket had yet been shot. It was only theoretical and a bit of preliminary experimental work.

Avalanche of Letters

It was in the midst of this period that I received a clipping from a rather important newspaper printed in the Middle West in America which reported that our rocket number so-and-so had reached an altitude of 27,134 feet—not one inch more or less! The photograph enabled us to recognise the rocket as one of our wooden models for testing air resistance. But I received approximately one pound of foreign mail every day asking why this unknown German inventor had made his great 70-kilometre rocket shot in secrecy and refused to sell his patents. This great man did not exist, his rocket did not exist, his patents were unknown to any patent office in the world. And I hated the mail!

I also heard at this time that the Russian Government had secretly built a rocket that had reached an altitude of about 50 miles. This news appeared simultaneously in German, French, Swiss and American newspapers. I wrote to Professor Rynin, the chief of the Russian Rocket Society GIRD. His reply came with the next mail: "I wish it were true, but it is not. I also do not have the laboratory with one hundred and twenty assistants reported in your papers."

The worst of these stories was that they were even mentioned in popular books, where they last until to-day. But Goddard's military rocket air torpedoes, invented in Berlin by a friend of Shershevsky's, and all the "secret" Russian and German rockets, were stories that could be killed one way or another. It was only necessary that somebody "belonging to the art" (to use the patent attorney's language) should approach the man credited with the achievement.

But the most famous of all rocket hoaxes that is to me still (to use a rather descriptive American slang expression) "a pain in the neck" is the one about the alleged rocket flight made by one brother Fischer in a rocket built by the other brother Fischer from the Island of Rügen in the Baltic.

I said that inventors of these stories slowly became more careful. This applies here; when it started, existing rocketeers were credited with experiments they had not made. That was easy. But now not only the experiment, but also the experimenter, were invented. The only really existing thing was the Island of Rügen—if I had not been there several times I would doubt that, too. As far as I succeeded in discovering, the story started in a well-known London Sunday paper in 1934. Here are some extracts from that monumental flight of fancy:—

"A sensational secret demonstration of the practicability of the rocket principle applied to flight was made here last Sunday when Herr Otto Fischer was shot six miles into the air within a 24-foot steel rocket and returned to earth safe and sound, though shaken.

"The pilot who risked his life in this experiment is brother of the designer and constructor of the rocket, Herr Bruno Fischer. . . . The demonstration was made under cover of absolute secrecy, under the auspices of the Reichswehr, the German War Ministry. . . .

"On Sunday morning, at 6 o'clock, Otto Fischer shook hands with his brother and the small group of Reichswehr officials present to witness the experiment, and crawled into the rocket through the small steel door.

"Bruno Fischer and the three officials then retired to a small hollow in the ground about two hundred yards away and Fischer closed the switch that sent the rocket on its journey. There was a blinding flash and a deafening explosion, and the slim torpedo-shaped body was gone from the steel framework in which it had rested.

"A few minutes later it came into sight again, floating nose upwards from a large parachute that had automatically been released when it had begun to descend. As it drifted nearer, the steel fins on the outside of the body could be seen moving as its pilot manipulated the rocket so that it would land on the island. A few seconds later it came to rest on the sands a few yards away, and Fischer crawled through the door of the rocket white and shaken, but smiling triumphantly. The journey through space had lasted 10 minutes and 26 seconds.

"'It was a tremendous sensation,' he said to the men who had rushed forward to congratulate him, 'When the rocket left the ground I was conscious of a deafening roar and an unbearable weight seemed to be crushing me against the floor of the rocket. Then I lost consciousness for a moment, due to the tremendous acceleration which drained the blood from my head. When I came to my senses and looked at the altimeter before my face it flickered at 32,000 feet and then began to drop rapidly. I had completed my climb and was descending. . . .'"

To "those skilled in the art" the thing was an 18-carat hoax at first glance.

All Over Again

But the mail began pouring in again. The American Rocket Society, the Cleveland Rocket Society, the Austrian Rocket Society, the British Interplanetary Society, yes, and GIRD in Moscow and GIRD in Leningrad, too, asked urgently for information. That's what scientific societies have honorary members in other countries for. I replied first mildly, then firmly, and finally furiously that only the Island of Rügen really existed and that it was a beautiful island.

The English began to blame their Sunday paper. Its editor replied that he was very sorry but he could not give additional information because the "shot was undertaken under conditions of the strictest secrecy and the news was only accidentally obtained from a thoroughly reliable source." People wrote that Ernest Loebell, the president of the Cleveland Rocket Society, had traced the facts and found the story true. When I asked him about it he replied that he "had never bothered tracing so silly a story."

Thus the fight went on for about two years. I cannot remember how many persons were interrogated. All of them should have been concerned in one way or another with the rocket shot, but most of them learned these "very interesting facts" for the first time through the questioning. Decidedly it could not come from the two certified German flights by rocket by the pilot Friedrich Stahmer in 1928 from the Wasserkuppe (the famous glider camp in the Rhön mountains) and by Fritz von Opel near Frankfurt-on-the-Main in 1929. In

both flights light aeroplanes or gliders with powder rockets attached to them were used.

Many features of the story were fantastic, but a few of them were more sensible and of a nature which the average newspaper correspondent would hardly imagine—for example, the drifting nose upwards. This may seem to substantiate the story a little, but a later development of it proves it finally to be a hoax. The May, 1935, issue of a well-known London magazine published an article by an equally well-known "popular" journalist, from whom I quote:—

"I decided to begin my investigations by flying to the first and most elaborately equipped rocket aerodrome, the Raketenflugplatz. A young engineer led me to the records chamber, where not only the work of the Raketenflugplatz is carefully recorded, but scientific results from rocket aerodromes in other parts of the world are collated. But even as I was conning these records a heavily built man with a charming smile and a curiously soft voice was introduced to me. 'Herr Otto Fischer.'

"Even as I shook hands with him I realised that I was meeting the one man who had travelled through space inside a rocket and lived to tell the tale—the first passenger to enclose himself in a steel rocket of some twenty-four feet which was shot six miles into the air. The rocket was designed and constructed by his brother, Herr Bruno Fischer. In great secrecy it was transported to the Island of Rügen. . . ."

Here it is said quite definitely that Herr Fischer could be found at the Raketenflugplatz, and it is indicated that the rocket was built there. Neither statement is true, or I would know about it. After all, the proving ground had to inform the vice-president what it was doing.

However, these preposterous claims give the key to the origin of the story. In 1932 a well-known German civil engineer, Herr Franz Mengering, paid a visit to the Raketenflugplatz with the proposal that the first real rocket flight should be undertaken under the auspices of officials at Magdeburg. Our engineer-in-chief, Rudolf Nebel, agreed to the proposal, and a passenger-carrying rocket with a ceiling of *one* kilometre was designed. A number of small test rockets of the general design were built and tested. Then a still larger type—but still unmanned—was built and tested at Wolmirstedt, near Magdeburg, in May, 1933, a short time before the story came out in London.

For several reasons which are of a too involved technical nature to be discussed here, and also for financial reasons, the largest rocket was not built, and the flight did not take place. Unfortunately, the over-enthusiastic publicity department in Magdeburg, unaware of the technical difficulties that arose in Berlin and which meant a long postponement, had issued a souvenir postcard with an artist's conception of the flight and the inscription, "The first manned rocket flight of the Magdeburg Pilot Rocket; Sunday after Pfingsten, 1933."

Thus (I hope) I have speared the Great Unknown of the Air; but from past experience I am not very hopeful that the man-made serpent will not again rear its ugly head. Perhaps some day I will meet the man who caused all this.

COUPE DEUTSCH ATTRACTIONS

Three Million Francs Additional Prizes : One Million for Foreign Competitors

MONSIEUR PIERRE COT, the French Air Minister, is evidently determined to make this year's contest for the Deutsch de la Meurthe Cup a grand affair. In addition to the 100,000 francs and a trophy normally offered for competition by Mlle. Deutsch de la Meurthe, he is offering prizes totalling three million francs, two million of which are reserved for French competitors while the third million is open to foreign contestants. The contest is to take place at the Mondesir (Etampes) aerodrome on Sunday, September 12.

The course is to be one of 2,000 km. (1,242.74 miles) and is to be flown in two stages of 1,000 km. each, with an hour's interval between them. As in previous years, engine capacity is to be limited to 8 litres (499.2 cu. in.).

The three million francs offered by the French Air Ministry are to be divided into three awards, each totalling one million; one for speed and distance covered in the contest by French competitors; one for speed in the actual contest, open to French machines only, and one for international competition.

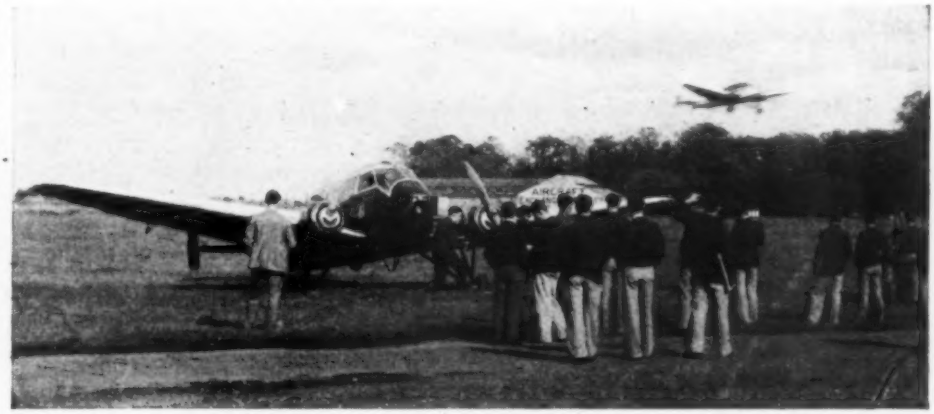
Any French machine which takes part in the contest will receive prize-money calculated on the formula $\frac{500,000}{2} \times (\frac{P}{P_0} - 1)$. In this formula $P_0 = 500 \times 440$; $P = LV$, L being the distance flown by competitor in the contest (in km.), and V his average speed (in km/h.). There is a proviso that no competitor may receive more than 500,000 francs in this class, which means that if he covers the whole course of 2,000 km. he will gain nothing in this class by averaging more than 443 km/h (275.3 m.p.h.).

Awards to French competitors who complete the course will be made on the following basis: To the fastest competitor 300,000 francs plus (V-443) × 4,000; maximum 500,000 francs. To the second fastest 180,000 francs plus (V-443) × 2,400; maximum 300,000 francs. And to the third fastest 120,000 francs plus (V-443) × 1,600; maximum 200,000 francs. V in all cases represents the average speed in km/h.

In the international class the French Government offers to purchase the winning machine, whether French or foreign, for a sum equal to 400,000 francs plus (V-443) × 7,000 francs, a maximum purchase price of 900,000 francs being imposed. Should the owner of the winning machine refuse to sell, the second fastest will be bought, the amount being smaller and calculated on a similar formula with the figures reduced. Similarly the prize may go to the third fastest, with still further reductions in the figures used in the formula. Finally, a prize of 100,000 francs will be awarded to the competitor who makes the fastest lap of the course provided this speed exceeds 469 km/h. (291.424 m.p.h.). This is reserved for French competitors.

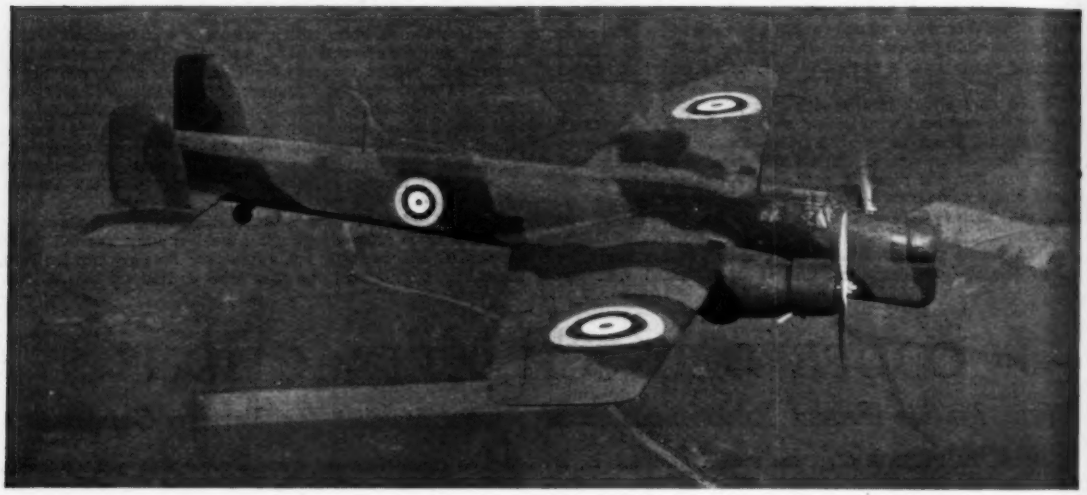
R. C. W.

MORE HANWORTH HOSPITALITY: General Aircraft Ltd., last week entertained 160 Canadian public schoolboys who are visiting Britain under the auspices of the National Council of Education of Canada. Following the fraternal Hanworth custom the party was also taken to call on Autogiro's, Kronfeld's, B.A., London Air Park Flying Club and Flying Training Ltd. Joy-rides provided the ultimate rapture.



THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS



MAN-MADE MIMICRY: The A.W. Whitley, with the new camouflage scheme, melts into the landscape. (*Flight* photograph.)

NOMENCLATURE OF AERO ENGINES—GIPSY-QUEEN AND GIPSYKING

The name of the new De Havilland six-cylinder, air-cooled, inverted in-line aero engine, about to be introduced into the service for installation in the Mentor I aeroplane, is the Gipsyqueen I. This name is to be used in all reports and correspondence relating to this type of aero engine. The relevant air publication is No. 1593A.

The name of the new De Havilland twelve-cylinder, air-cooled, inverted "vee" supercharged aero-engine, about to be introduced into the service for installation in the Don I aeroplane, is the Gipsyking I. This name is to be used in all reports and correspondence relating to this type of engine. The relevant air publication is No. 1594A.

CENTRAL FLYING SCHOOL

The undermentioned officers and airmen have been recategorised as under:—

A.2 to A.1

Flt. Lts. C. F. Birks, R. Cleland, R. B. Lees, Sgts. Williams, J., Forster, W. H., Grout, D. L., Jobbins, L.

B. to A.2

Flt. Lts. L. A. Cubitt, T. J. MacDermot, J. O. W. Oliver, G. T. Jarman, D. G. Lewis, T. G. Lovell-Gregg, J. N. McAuley, A. W. Sweeney, R. E. de T. Vintras, W. T. F. Wightman, C. W. Williams, K. B. B. Cross, R. G. S. Morgan-Smith, P/O. C. E. Sims, Sgts. Hall, A. W., Owens, T. R. W., Scragg, C., Setchell, R. G.

C. to B.

Miles, D. W. K.

Captain S. A. Melville, South African Air Force, has been tested and assessed at the A.1 category standard.

ROYAL AIR FORCE FLYING ACCIDENTS

The Air Ministry regrets to announce that A.P/O. Ormond Graham Thomson died on May 19 as the result of injuries received in an accident which occurred at Tern Hill on May 13 to an aircraft of No. 10 Flying Training School, Tern Hill, Market Drayton, Shropshire. The other occupant of the aircraft, No. 363713 Sgt. C. F. C. Ridout, was not injured.

The Ministry also regrets to announce that P/O. Thomas Templer Richardson lost his life in an accident which occurred at Seaham Harbour on May 14 to an aircraft of No. 607 (Fighter) Squadron, Auxiliary Air Force. P/O. Richardson was the pilot and sole occupant of the aircraft.

The announcement is also regretfully made that No. J.X.12597 Telegraphist George Baxter lost his life as the result of a collision in the air which occurred at Spithead on May 11 between two aircraft of No. 821 (Fleet Spotter-Reconnaissance) Squadron, Southampton. Telegraphist Baxter was the passenger of one aircraft. The pilots of the two aircraft, Flt. Lt. J. V. C. Badger and Lt. J. A. Ievers, R.N. (Flying Officer, R.A.F.), and a further passenger, No. J.10997 Telegraphist W. Westerman, were not injured.

TEMPORARY ANTI-AIRCRAFT PRACTICE CAMP

A temporary anti-aircraft practice camp for 1937 opened at Flimston Down, Pembroke, on May 11, and has been placed in the Fighter Command in No. 11 (Fighter) Group. The camp will be occupied by the personnel of "B" Flight, No. 1 Anti-Aircraft Co-operation Unit. A temporary landing ground at Flimston Down and a forced landing ground near Manorbier have been provided. The forced landing ground is in close proximity to the gun position at Old Castle Head, Manorbier.

TRANSFER OF OFFICERS TO THE RESERVE

The undermentioned short-service and non-permanent officers should note that they become due in October or November next for transfer to the reserve, or (where indicated) for relinquishment of commission, on completing their period of service on the active list:—

General Duties Branch.—Flt. Lt. Donald William Baird.
Medical Branch.—Flt. Lt. Robert Ernest Walmsley Fisher, M.B., B.Ch.
Dental Branch.—Flt. Lt. Charles Roland Stone, L.D.S.
Chaplains Branch.—The Reverend Gerald William Norris Groves, A.L.C.D. (To relinquish commission, not liable for reserve service.)

Statements from the Reverend G. W. N. Groves and Flt. Lt. Stone indicating whether or not they desire to be considered for extensions of service to six and ten years on the active list respectively, are to be forwarded forthwith.

FORMATION OF NEW SQUADRONS

The formation of No. 115 (Bomber) Squadron at Marham has been deferred until June 28, 1937.

No. 612 (County of Aberdeen) (Army Co-operation) Squadron, Auxiliary Air Force, will form at Aberdeen (Dyce) aerodrome on June 1, 1937. The unit will be placed under the command of the A.O.C.-in-C., Bomber Command, in No. 6 (Auxiliary) Group and

will be administered by the Territorial Army and Air Force Association of the County of the City of Aberdeen, 5, East Crabistone Street, Aberdeen. The postal address will be No. 612 (County of Aberdeen) (Army Co-operation) Squadron, Auxiliary Air Force, Aberdeen (Dyce) Aerodrome, Aberdeen.

No. 614 (County of Glamorgan) (Army Co-operation) Squadron, Auxiliary Air Force, will form at Cardiff airport on June 1, 1937. The unit will be placed under the command of the A.O.C.-in-C., Bomber Command, in No. 6 (Auxiliary) Group, and will be administered by the Glamorgan Territorial Army and Air Force Association, 6, St. Andrews Crescent, Cardiff. The postal address will be No. 614 (County of Glamorgan) (Army Co-operation) Squadron, Auxiliary Air Force, Cardiff Airport, Glamorgan.

No. 615 (County of Surrey) (Army Co-operation) Squadron, Auxiliary Air Force, will form at the R.A.F. Station, Kenley, on June 1, 1937. The unit will be placed under the command of the A.O.C.-in-C., Bomber Command, in No. 6 (Auxiliary) Group and will be administered by the Territorial Army and Air Force Association of the County of Surrey, Burwood House, 16, Caxton Street, London, S.W.1. The postal address will be No. 615 (County of Surrey) (Army Co-operation) Squadron, Royal Air Force Station, Kenley, Whyteleafe, Surrey.

ROYAL AIR FORCE GAZETTE

London Gazette, May 18, 1937

General Duties Branch

The following are granted permanent commissions as Pilot Officers with effect from May 4 and with seniority of the dates stated:—J. H. Barrett, B. C. Bell (August 4, 1935); F. C. Phipps, H. F. Thomson (February 4, 1936); E. M. Ware (October 24, 1936).

The following airman pilots are granted permanent commissions as Pilot Officers on probation with effect from and with seniority of May 5:—Sgt. S. C. Bastin, Sgt. R. W. Christmas, Sgt. H. Z. Foreman, Sgt. L. Fox, Sgt. L. Gregory, Sgt. L. Jobbins, Sgt. H. C. Marshall, Sgt. J. W. Monk, Sgt. J. E. Pebody.

The following are granted short service commissions as Acting Pilot Officers on probation with effect from and with seniority of May 3:—F. Austin, W. S. Bowyer, J. K. Buchanan, C. Y. Buckley, H. A. Chater, W. Dobson, R. P. Elliott, L. Ereminsky, F. G. Hanlan, A. J. Hannigan, D. Hayley Bell, D. Hill, L. A. G. Howard, F. J. Howell, H. H. Jackson, H. R. Jaggard, W. G. Joy, R. A. Kellow, F. A. H. Lambart, H. J. Lavers, A. B. Lennie, T. N. Linley, D. G. Lough, J. W. C. McFarlane, J. H. F. MacLachlan, L. A. McSherry, T. B. Marshall, P. R. O'Connor, A. S. Peter, A. N. Pirie, J. D. V. Porter, J. L. Riley, G. L. Sinclair, T. M. W. Smith, J. P. Trewby, T. Waddington, P. H. Way, G. H. Wherry.

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—G. H. Gatheral (May 1); R. M. Bradley (May 7).

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—P. D. Holder (seniority December 3, 1935) (September 3, 1936); K. S. Batchelor (March 24); A. A. Case (April 19); C. E. E. Florigny (April 14).

Cdr. T. O. Bulteel, R.N., is reattached to the R.A.F. as a Wing Commander, with effect from May 10 and with seniority of January 1; Lt.-Cdr. N. Kennedy, R.N., is reattached to the R.A.F. as a Flight Lieutenant with effect from May 2 and with seniority of January 1, 1934; F/O. L. H. Pomeroy resigns his short service commission (May 9); the short service commission of Acting Pilot Officer on probation L. A. H. Wardill is terminated on cessation of duty (May 10).

Medical Branch

J. H. L. Newnham, M.R.C.S., L.R.C.P., is granted a short service commission as a Flying Officer for three years on the active list with effect from and with seniority of May 3, and is seconded for duty at the London Hospital; P. A. Wilkinson, M.R.C.S., L.R.C.P., is granted a short service commission as a Flying Officer for three years on the active list with effect from and with seniority of May 3, and is seconded for duty at the Derbyshire Royal Infirmary.

Chaplains Branch

The Reverend A. R. J. Symes relinquishes his short service commission (May 14).

Commissioned Engineer Officer

Flying Officer on probation E. L. Magrath is confirmed in his appointment (April 14).

Memorandum

The permission granted to S. G. Spiro to retain the rank of Lieutenant is withdrawn with effect from February 25.

Erratum

In the *Gazette* of April 13, for Alexander Davidson read Alexander Macdonald Davidson.

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Sister Miss H. M. Ellis is transferred to the permanent service (April 1).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

A. B. Smith, M.C., is granted a commission as a Flight Lieutenant in Class C (March 29); A. L. Harris is granted a commission as Flying Officer in Class C with effect from May 4 and with seniority of November 3, 1930; Lt. R. W. Langmaid is granted a commission as Flying Officer in Class C with effect from May 11 and with seniority of May 8, 1936; Capt. C. I. Casey, M.C., is granted a commission as Flying Officer in Class C with effect from May 18 and with seniority of March 20, 1936; Flt. Lt. H. M. Schofield is transferred from Class A to Class C (May 14); F/O. J. C. Cantrill is transferred from Class A to Class C (March 11); F/O. J. C. E. Luard is transferred from Class AA (ii) to Class C (April 3); F/O. C. L. Milligan resigns his commission (February 25); Flt. Lt. F. W. M. Downer relinquishes his commission on appointment to a commission in the South African Air Force Special Reserve of Flying Officers and is permitted to retain his rank (February 19); F/O. L. A. G. Howard relinquishes his commission on appointment to a short service commission in the Royal Air Force (May 3); F/O. C. W. Usher relinquishes his commission on completion of service (February 22).

AUXILIARY AIR FORCE

General Duties Branch

No. 501 (COUNTY OF GLOUCESTER) (BOMBER) SQUADRON.—R. Bicknell is granted a commission as Pilot Officer (April 14).

No. 504 (COUNTY OF NOTTINGHAM) (BOMBER) SQUADRON.—P/O. G. Greaves is promoted to the rank of Flying Officer (April 16).

No. 600 (CITY OF LONDON) (FIGHTER) SQUADRON.—P/O. J. H. C. Rowe is promoted to the rank of Flying Officer (January 7); P/O. H. St. J. Coghlan resigns his commission on appointment to the Auxiliary Air Force Reserve of Officers (April 23).

No. 601 (COUNTY OF LONDON) (FIGHTER) SQUADRON.—F/O. A. C. W. Norman is promoted to the rank of Flight Lieutenant (January 25).

No. 604 (COUNTY OF MIDDLESEX) (FIGHTER) SQUADRON.—The following Pilot Officers are promoted to the rank of Flying Officer (April 11):—G. O. Budd, J. A. Davies.

No. 608 (NORTH RIDING) (FIGHTER) SQUADRON.—P/O. H. J. Williams is promoted to the rank of Flying Officer (April 11).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

H. St. J. Coghlan is granted a commission as Pilot Officer in Class C (April 23).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captains.—E. O. Grenfell, M.C., D.F.C., A.F.C., to Aircraft Depot, Hinaidi, Iraq; to command, 6.4.37. W. C. Hicks, A.F.C., to Headquarters, No. 30 (Balloon Barrage) Group, London; for duty as Senior Air Staff Officer, 1.5.37.

Wing Commander.—B. E. Baker, D.S.O., M.C., A.F.C., to R.A.F. Station, Gosport; to command, 1.5.37.

Squadron Leaders.—A. P. Bett, to No. 9 Flying Training School, Thornaby; for duty as Chief Flying Instructor, 26.4.37. E. J. George, to No. 76 (Bomber) Squadron, Finningley; for Flying duties, 26.4.37. H. M. G. Parker, to No. 102 (Bomber) Squadron, Finningley; for Flying duties, 19.4.37. N. A. P. Pritchett, to No. 79 (Fighter) Squadron, Biggin Hill; to command, 26.4.37.

Flight Lieutenants.—D. J. Alvey, to No. 3 Flying Training School, Grantham, 6.5.37. C. C. McMullen, to R.A.F. Station, Biggin Hill, 29.4.37. W. R. Monro Higgs, to Headquarters, No. 12 (Fighter) Group, Uxbridge, 28.4.37. J. G. W. Weston, to R.A.F. Station, Feltwell, 22.4.37.

Pilot Officer.—C. H. Bull, to No. 1 Anti-Aircraft Co-operation Unit, Biggin Hill, 26.4.37.

Acting Pilot Officers.—B. A. Miller, to No. 30 (Bomber) Squadron, Dhibban, Iraq, 12.4.37. G. V. T. Shaen-Carter, to No. 55 (Bomber) Squadron, Hinaidi, Iraq, 12.4.37. J. S. Douglas-Cooper, G. E. Watkins, to No. 70 (Bomber Transport) Squadron, Hinaidi, Iraq, 12.4.37. R. H. McClatchey, to No. 84 (Bomber) Squadron, Shaibah, Iraq, 12.4.37.

Medical Branch

Flying Officer.—J. D. Milne, to R.A.F. Station, Worthy Down, 3.5.37.

Chaplains Branch

Revd. J. F. Cox, M.C., M.A., to R.A.F. Station, Halton; for duty as Chaplain (C. of E.), 3.5.37.

HERE and THERE

AH, WILDERNESS! Recalling the Western Front, but actually one of several ponds which are being filled in on the 220 acres of virgin farm-land that is rapidly being transformed into a municipal airport for Birmingham. The site is at Elmdon, seven miles out from the City centre. An unusually comprehensive drainage system is now being installed by the contractors, who are B. Sunley and Co., Ltd., of Brentford.

British Owners' Austrian Whitsun

EACH year the Austrian Aero Club organises a Whitsun tour. This year the German Aero Club co-operated, and as a result (writes an Austrian correspondent) the route took in parts of Germany.

The event began on May 14, in bright sunshine which continued throughout, at Basel aerodrome, which formed the centre. Of the 54 machines entered (13 Austrian, 16 German, six British, one French, three Italian, one Polish, four Swiss, one Czech and nine Hungarian) several failed to start, and only 44 began the tour.

May 14 was given over to various festivities, but next day, about midday, a start was made towards Altenrhein, where there was a halt of several hours. The same afternoon the journey was continued to Innsbruck. The weather remained fine, so that on the next stages, to Klagenfurt and Graz, participants had a fine impression of the Alps.

On Whit-Monday, after lunch, the party flew from the Thalerhof aerodrome to the Vienna airport at Aspern. In the evening the Mayor of Vienna held a reception, and the next day the visitors toured the city. Early on the 19th they flew to Linz, and afterwards to Augsburg.

The ancient town of Augsburg had organised a flying meeting and, in addition to the Whitsun Flight tourists, many prominent personalities arrived. They included Mr. Lindsay Everard, M.P., chairman of the Royal Aero Club of Great Britain, and Mr. R. Perkins, M.P., who proudly left the machine with his umbrella. [After landing, we hope.—ED.]. From Germany came Wolfgang von Gronau, Herr Thomsen, leader of German sporting aviation, Major Siedemann of the General Staff, and other well-known figures. From Finland there arrived Weinö Bremer with his wife; they had flown the greatest distance of all. Bremer used to be a military pilot, and is now a fox farmer. He flies a Junkers Junior, richly decorated with advertisements, and travelled via Riga, Königberg, Warsaw, Budapest, Vienna and Munich.

From the technical aspect there was little novelty to be seen. The Italian Ghibli, a twin-engined light bomber, was new, although it took part in the Oases Circuit. The Austrian Lampich N.L. XXI biplane was also unfamiliar, as was the Meindl A.7b, a strut-braced low-wing monoplane.

At the official reception at Augsburg in the evening, Col. Messmer, of the Swiss Aero Club, and Prince Kinsky of the Austrian Aero Club, thanked the previous speakers, Wolfgang von Gronau and Mayor Mayr, for the hospitality they had enjoyed in Augsburg.

On May 20 the visitors went sightseeing in Augsburg, and in the evening all gathered for a farewell banquet in the Schlosshotel.

Unhappily, the tour was marred by a fatal accident to Count Arco-Zinneberg (whose machine was numbered 13). The cause was a sideslip from a very steep turn at Esslingen.

Of the British entry of nine, no fewer than eight were D.H. aircraft of various types and vintages, ranging from a Fox Moth to a Dragonfly.

Mr. Lindsay Everard, M.P. (facing camera), snapped with friends during the Austrian Tour. He participated in his D.H. Dragonfly, flown by Flt. Lt. A. Hole.

Don't Shoot-up Shoreham on June 2!

IT may be recollected that about a year ago, under the auspices of the Air League, a demonstration was staged at Heston in order to familiarise police and other authorities with the distinctions between safe and dangerous flying.

Another such event, on rather similar lines, is to take place at Brighton, Hove and Worthing Airport on the afternoon of Wednesday, June 2, organised by the Joint Airport Committee for the benefit of the Brighton Borough Police, Hove Borough Police, and the West and East Sussex County Forces. Some 120 officers are expected to be present.

Normal and emergency take-off, approach and landing methods will be demonstrated and explained and, in short, the police will be shown the difference between the tactics of a skilled pilot looking for a landing place in conditions of bad visibility or threatened engine trouble and those of one of the "clever" brigade showing-off built-up areas for the benefit of his friends.

There is also to be a "static" display of the documents, licences, etc., which a pilot and/or owner is expected to produce, together with a demonstration of dealing with petrol fires. Red-tape-ridden air tourists may suggest that these last two items might be symbolically combined—without too much haste in subduing the fire.

Provided that the flying demonstration can and does impart more than that little knowledge which is a dangerous thing, the idea has something to commend it, especially in an area such as this busy South Coast one where low flying, excusable and otherwise, is a common occurrence.

Busy Week for F.A.I. Conference Delegates

DETAILS of the thirty-seventh meeting of the Federation Aeronautique Internationale, to be held in London between June 21 and June 27, have now been settled, and following is the official time-table:

Monday, June 21

10.0-5.0: Committee Meeting at Directorate of Civil Aviation, Ariel House, Strand.

Tuesday, June 22

10.0-1.0: Committee Meeting, Ariel House.
5.30: Gathering of delegates and ladies at the Royal Aero Club.
5.45: Departure for Parliament.
6.0: Reception by members of the Parliamentary Air Committee at House of Commons.

Wednesday, June 23

9.30-12.30: Committee Meeting, Ariel House.
1.30: Lunch to Committee members at Royal Aero Club.
3.0-5.0: Official opening of the 37th Conference by H.R.H. the Duke of Kent at Ariel House, followed by general conference.
6.0-7.0: Cocktail Party to delegates and ladies at Londonderry House.
10.15: Reception to delegates and ladies by Sir Philip Sassoon, Under-Secretary of State for Air, at 45, Park Lane.

Thursday, June 24

9.30-12.30: General Conference at Ariel House.
1.0: Lunch to delegates and ladies by Royal Aero Club at Savoy Hotel.
3.0: General Conference, Ariel House.

Friday, June 25

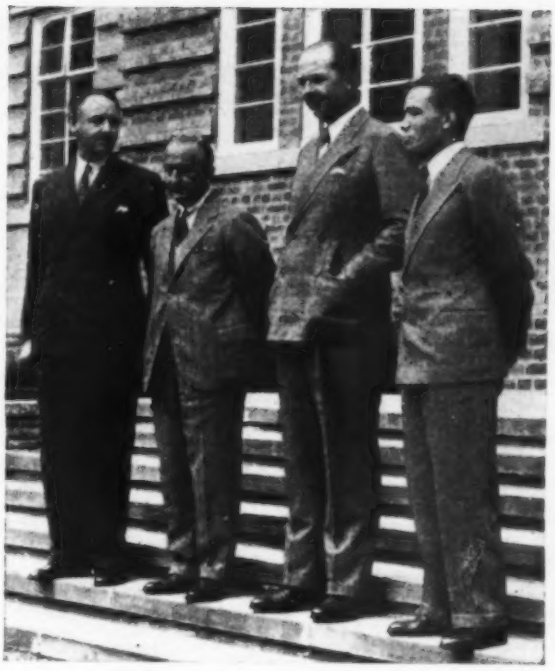
9.30-12.30: General Conference, Ariel House.
3.0: General Conference, Ariel House.
8.30: Official Banquet by His Majesty's Government at Grosvenor House. (Viscount Swinton, Secretary of State for Air, in the chair.)

Saturday, June 26

10.45: Gathering at Royal Aero Club.
11.0: Departure for Hendon Aerodrome.
12.0: Lunch by Royal Aero Club at Hendon to delegates and ladies.
3.0: R.A.F. Display.

Sunday, June 27

10.0: Departure from Royal Aero Club for Heston, followed by flight to Ratcliffe, Leicestershire. Machines provided by Royal Aero Club.
1.0: Lunch at Ratcliffe as guests of Mr. W. Lindsay Everard, M.P., chairman of the Royal Aero Club.
3.0: Start of return flight to Heston.



THE CROWN PRINCE OF GREECE during his visit last week to the Bristol Company's works. Left to right: Mr. H. J. Thomas (asst. managing director), Sir G. Stanley White (managing director), H.R.H. Prince Paul, and Flt. Lt. Potamianos.

Both Ends of the Beam

(*Concluded from page* 533).

Estimates debates, nor even the comments made on them by *Flight three weeks ago*.

Now, apart from this, in "McCockney's" letter this is evidence of confused thinking. In one paragraph he talks glibly of potential recruits spending their time dreaming of "dizzy heights," "wonderful speeds," and "creating havoc against enormous odds." Yet in another the same intrepid heroes are supposed to be thinking mostly of serving long enough to qualify for a pension. Having the imagination to conceive the former, does "McCockney" imagine that the fellow that "creates havoc" is the type that keeps his pension in front of him?

During the last war no temporary officer had any legal right even to a disability pension. (This has now been righted). If, as "McCockney" says, "the R.A.F. offers no career for either officer or man," the fact that recruiting has been so healthy is one of the most encouraging signs of the rebirth of the same altruistic patriotism.

Another point—"McCockney" in one place speaks of operating a searchlight as if it were some menial task, and yet, in another, as an interesting ground job, suitable for time-expired airmen and pilots. Although I entirely agree with the principle of the latter I cannot applaud "McCockney's" attitude. The fighter pilot is undoubtedly the spearhead of our defence and anything that is essential to the efficient carrying out of his work cannot be regarded as menial. A spearhead is little use without a shaft and at night the searchlight beam is the shaft.

If your correspondent imagines himself as the unreal hero of hot-air stories he can stretch a point and forget security and pension. If, on the other hand, he is a level-headed fellow thinking of the efficient waging of a war as well as of himself and his future he will soon realise that co-operation in helping the other fellows to do their jobs is the main thing.

McSCOTCH.

London, S.W.5.

TWO-WAY SPIRIT: Merrill's Electra being refuelled on Southport Sands in readiness for its return Atlantic flight.

THE INDUSTRY

Straight-line Economy

IT may be recalled that last week we quoted Dick Merrill's praise of the Sperry automatic pilot used in the Lockheed Electra in which he made his two-way Atlantic crossing. One additional point of interest is that on draining the fuel tanks at the end of the eastward flight he found he had about 100 gallons remaining—far more than he had expected. This economy Merrill attributed in a large measure to the accurate altitude and directional control of the automatic pilot.

Royal Customer

AMONG the Coronation visitors who took advantage of their stay in London to replenish their kit was H.R.H. the Crown Prince of Greece, who made a number of purchases at the shop of D. Lewis, Ltd., flying and motoring clothing specialists, 124, Great Portland Street, London W.1.

Air Survey Reorganisation

IT may have been inferred from a recent statement that the Aircraft Operating Co. of Africa (Pty.), Ltd., has been liquidated in the course of the recent reorganisation of the Hemming interests. Actually, this subsidiary is unaffected.

"Divine Wind" Blows Home

THOUGH leisurely compared with her outward flight of 94 hours, the *Divine Wind's* return journey from London to Tokio was made in under a week for the 10,000 miles. Messrs. Iinuma and Tsukagoshi put their trust in one engine —and in that engine Shell fuel and oil.

AERONAUTICAL PATENT SPECIFICATIONS.

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(*Published May 20, 1937.*)

224909. BIEHL, H.: Apparatus for the production of flight vouchers (464,597).
25716. BENDIX AVIATION CORPORATION: Carburettors for internal combustion engines (464,760).
28936. TAMPIER, R.: Hand control levers for the carburettor throttles of internal combustion engines (464,686).
29119. SHORT BROS. (ROCHESTER AND BEDFORD) LTD., and GOUGE, A.: Mounting and employment of guns on aircraft (464,691).
29520. FORGE ET USINAGE DE METAUX LEGERS (Helices Metalliques Chauviere): Air-screws (464,798).
873. CESKA SBROJOVKA AKCIOVA SPOLECNOST V. PRAZE: Devices for synchronising the firing from machine guns mounted in aeroplanes (464,522).
16196. OWEN, B.: Aeroplanes, seaplanes, and the like (464,607).
17539. JUNKERS-FLUGZEUGWERK AKT.-GES.: Dual-control arrangements for aeroplanes (464,548).
22080. MECANIQUE MODERNE ET ANKER REUNIS: Sliding doors for hangars (464,560).
27644. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Scavenging and charging of the cylinders of two-stroke internal-combustion engines (464,750).
28147. ARMSTRONG SIDDELEY MOTORS, LTD., and CUTLER, G.M.: Control of gearing for driving superchargers on aircraft engines (464,668).
28148. ARMSTRONG SIDDELEY MOTORS, LTD., and CUTLER, G. M.: Gearing for driving superchargers on aircraft engines (464,669).
29814. ARMSTRONG SIDDELEY MOTORS, LTD., and CLARK, T.: Resilient drive for the gearing of aircraft engine superchargers (464,670).

(*Published May 27th, 1937.*)

30206. VICKERS (AVIATION), LTD., PIERSON, R.K., and FIRMAN, R.A.: Trimming devices for Aircraft flying-controls (465,131).
30268. ALGARSSON, G.: Variable-pitch propellers. (464,991).
33632. BRISTOL AEROPLANE CO. LTD., FEDDEN, A.H.R. and MAYER, F.: Exhaust systems for internal-combustion engines (465,071)
5789. BRISTOL AEROPLANE CO., LTD., and PONTING, R.: Rotary pumps (464,87[illegible]).
21186. STEVENS, F.: Variable-speed gear (465,018).
22835. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES: Arrangements for actuating a power member in accordance with the movement of a control member (464,891).
22871. TELEFUNKEN GES. FUR DRAHTLOSE TELEGRAPHIE: Radio systems for detecting or spotting aircraft and other moving bodies (465,023).

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

THE COVENTRY REPETITION COMPANY LTD. Registered as a public company on April 23 with a nominal capital of £100,000 in 400,000 shares of 5/- each. Objects: to carry on the business of manufacturers of and dealers in all kinds of engineering, electrical, scientific and aeronautical apparatus, tools and machinery, manufacturers of and dealers in motor vehicles, aircraft, etc. The first directors are to be appointed by the subscribers. Solicitors: Cosmo Cran and Co., 5, Devonshire Square, London, E.C.2.

MILLAR AVIATION LTD. Private company, registered April 30. Capital, £1,000 in 1,000 shares of £1 each. Objects: To carry on the business of [illegible] facturers of and dealers in aircraft. The first directors are: John H. Millar, A.R.Ae.S.I., and John Torre Bett, B.A.(Oxon). Solicitors: Clarke [illegible] and Co., 28, Bolton Street, London, W.1.

LUNDY AND ATLANTIC COASTS AIR LINES, LTD.—Registered as a private company on April 26, with a nominal capital of £10,000 in 10,000 shares of £1. Objects: to adopt an agreement with Robert T. Boyd and Frank J. Perna, and to carry on the business of operators of airports, etc. The directors are: Robert T. Boyd, Trafalgar Lawn, Barnstaple, aerodrome propr.; Felix W. Gade.

HORDERN-RICHMOND AIRCRAFT, LTD.—Registered as a private company on April 29, with a nominal capital of £10,000 in 10,000 shares of £1. The objects are to carry on the business of manufacturers of and dealers in aircraft, aeronautical apparatus, etc. The directors are: The Duke of Richmond and Gordon, Edmund G. Hordern, Hugh S. Kevill-Davies. Registered office: 28, Berkeley Street, London, W.1.

INVERNESS AERO CLUB, LTD.—Registered as a private company on May [illegible] with a nominal capital of £2,000 in 2,000 shares of £1 each. Objects: to establish and conduct a club for the purpose of affording to its members facilities for flying, etc. The first directors are Whitney W. Straight (Brettenham House, Strand, London) and others to be appointed by the subscribers.

INVERNESS AIRPORT LTD. was registered as a private company on May [illegible] with a nominal capital of £5,000 in 5,000 shares of £1 each. Objects: To carry on the business of proprietors and managers of airports or aerodromes in any part of the world, etc. The first directors are Whitney W. Straight (Brettenham House, Strand, London) and others to be appointed by the subscribers.

R.J.F. LTD. Private company, registered May 14. Capital, £100 in 100 shares of £1. Objects to carry passengers, goods and mails in aircraft, motor and other vehicles, etc. The directors are: Roland J. Falk and Frank A. Nicholl. Regd. office: 10, Old Jewry, London, E.C.2.

AVIMO LTD. Private company, Registered May 22. Capital £6,000 in 20,000 5% preference shares of 5/- each and 20,000 ordinary shares of 1/- each. Objects: to carry on the business of manufacturers of and dealers in accessories and component parts of engines used for propulsion of or fitted to airplanes, airships or other means of locomotion, including automobiles and rail cars, etc. The directors are: Herbert C. M. Stevens, and Air-Commodore Bertie C. H. Drew, C.M.G., C.B.E. Registered office: 27, Regent Street, S.W.1.

Forthcoming Events

May 26-June 6. Brussels Aero Show.
May 26-30. Austrian Aero Club: Salzburg Gliding Contest.
May 27. R.Ae.S. Wilbur Wright Lecture: "Turbulence," by Dr. Theodor von Karman. Institution of Electrical Engineers.
May 29. Empire Air Day.
May 29-31. London-Isle of Man Race and Round-the-Island Contests.
June 2. "Safe Flying" Demonstration for Sussex Police, Brighton, Hove and Worthing Airport.
June 4-6. York and Leeming Club: International Meeting, York.
June 11-14. Hungarian Aero Club: International Conference.
June 12. Bristol and Wessex Aeroplane Club: Garden Party, Whitchurch.
June 15-20. Magyar Pilota Picnic, Hungary.
June 20. R.Ae.C. of Belgium: Gordon Bennett Balloon Race, Brussels.
June 21-28. Federation Aeronautique Internationale: London Conference.
June 26. Royal Air Force Display, Hendon.
June 28 and 29. S.B.A.C. Display, Hatfield.
July 1. Aero Golfing Society: *Flight* Trophy.
July 3. Newcastle-on-Tyne Aero Club: London-Newcastle Race.
July 3. Ramsgate Airport, Official Opening.
July 4-18. Aero Club of Germany: Wasserkuppe Gliding Meeting.
July 10. Cardiff Aeroplane Club: London-Cardiff Race.
July 11. Herts and Essex Aeroplane Club: Air Display, Broxbourne.
July 11. Italian Aero Club: Circuit of Rome.
July 15. Aero Golfing Society: Jubilee Cup.
July 17. Portsmouth Aero Club: Garden Party.
July 17-18. Deauville Rally.
July 23-August 1. Swiss International Meeting.
July 24. Devon Air Day and Race: Plymouth and Exeter.
July 30-August 15. "Avia" Aero Exhibition, the Hague.
July 31. Cinque Ports Flying Club: Folkestone Aero Trophy Race.
July 31-August 2. Yorkshire Gliding Club: Opening Meeting Sutton Bank.
August 1-14. Yorkshire Gliding Club: Instructional Camp, Sutton Bank.
August 1-31. New York-Paris Air Race Flights.
August 3-September 7. Public Schools Aviation Camp, Norwich.
August 6-7. Austrian Aero Club: International Rally, Lake Worth.
August 14-22. Yorkshire Gliding Club: Open Contest, Sutton Bank.
August 21. Thanet Aero Club: Aviation Meeting and Race.
August 21. Midland Aero Club: "At Home."
August 22-29. Italian Aero Club: Circuit of Littorio.
August 28 and 29. Cinque Ports Flying Club: Lympne International Rally and Wakefield Trophy Race.
August 28-September 25. B.G.A. National Soaring Competition, Great Hucklow.
September 10-11. R.Ae.C.: King's Cup Race.
September 12. Aero Club de France: Coupe Deutsch de la Meurthe, Etampes.
September 23. Aero Golfing Society: Cellon Trophy.